Tracor Instruments

OPERATION AND SERVICE MANUAL

RUDMOSE

GROUP AUTOMATIC RECORDING AUDIOMETER

MODEL ARJ-4A

SERIAL NO._____ 9355

March 1968

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A RUDMOSE AUTOMATIC RECORDING AUDIOMETER MODEL ARJ-4A OPERATION

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SECTION I

GENERAL DESCRIPTION

1-1 INTRODUCTION

1-2 The Rudmose Group Automatic Recording Audiometer Model ARJ-4A (figure 1-1) consists of two or more Rudmose Automatic Recording Audiometers mounted in a vertical cabinet, in conjunction with the necessary controls and wiring to permit one operator to perform an audiometric test on as many as ten individuals simultaneously.

1-3 DESCRIPTION

1-4 The control panel located at the top of the cabinet contains the POWER, TEST, and PRACTICE switches. The POWER switch controls application of a-c power to each audiometer. The TEST switch simultaneously starts the test of each audiometer in the group. The PRACTICE switch provides power through the POWER switch on each audiometer to the table motor, provided that the POWER switch on the audiometer is placed to the GROUP position. All control panel functions are connected to the audiometer units by a wiring harness located in the back of the cabinet (figure 1-2). The wiring harness connects the appropriate plugs to the rear panels of each audiometer.

1-5 The Group Automatic Recording Audiometer Model ARJ-4A provides a highly versatile system for audiometric testing where any or all units may be used. Any audiometer may be turned off or removed without affecting the operation of the other units.

1-6 Integration of the Automatic Recording Audiometer into a group configuration results in operational changes to the individual audiometer units. Individual operation of the audiometer units is not recommended when the PRACTICE switch, located on the control panel, is in the ON position. If individual operation is desired, this PRACTICE switch should be turned off. In this condition, complete control of the audiometer units is possible. If it is

desirable to operate an audiometer unit in another area the unit may be unplugged from the cabinet and moved, together with the appropriate headset and handswitch, to the desired location.

Figure 1-1. Rudmose Group Automatic Recording Audiometer Model ARJ-4A

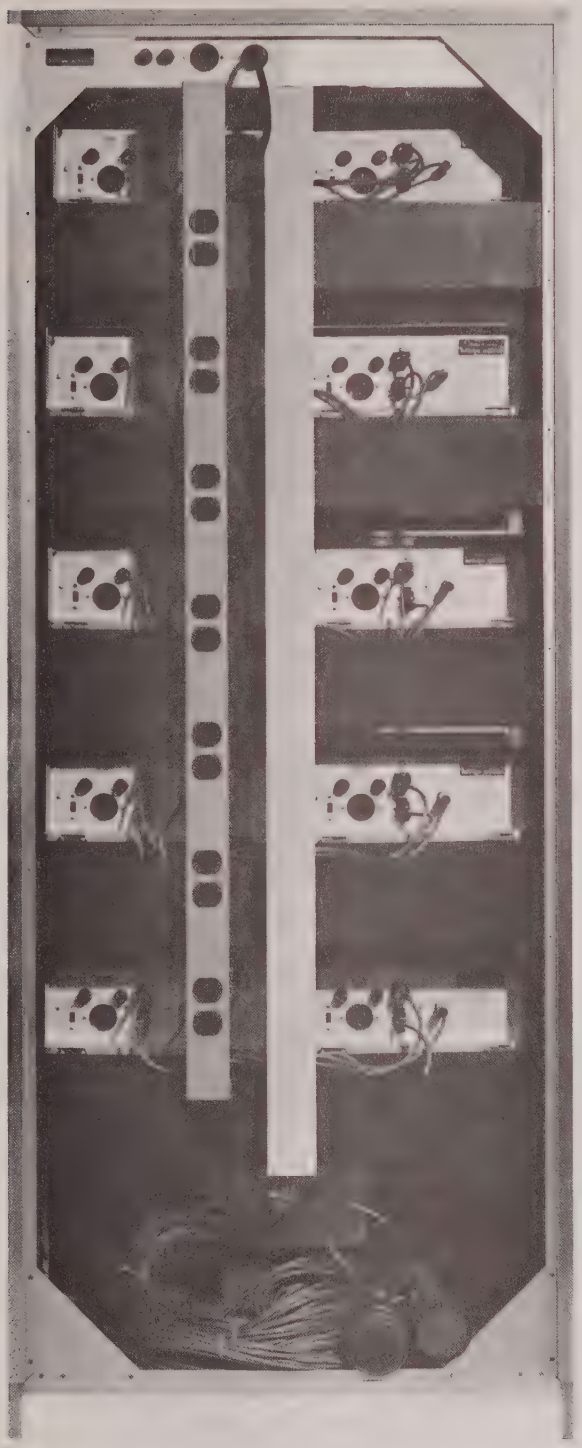


Figure 1-2. Rudmose Group Automatic Recording Audiometer Model ARJ-4A, Rear View

SECTION II

INSTALLATION

2-1 INTRODUCTION

2-2 This section provides step-by-step procedures for the installation of the Rudmose Group Automatic Recording Audiometer Model ARJ-4A and booth wiring. The installation procedures for the Automatic Recording Audiometer are contained in Section II of Appendix A to this manual.

2-3 CABINET INSTALLATION

2-4 The installation procedures for the Rudmose Group Automatic Recording Audiometer Model ARJ-4A cabinet are as follows:

(a) Remove cabinet from packing crate and place in vertical position.

(b) Attach power cord to power input connector at rear of control panel. (Do not connect to A-C line.)

(c) Check fuses at control panel.

(d) Remove cables from storage and extend to booth.

(e) Loosen cable hold-downs at shelf positions and install cable harness.

(f) Remove top cover of each audiometer carrying case and remove accessory package.

NOTE

The head-phones in the accessory package must be used with the audiometer containing that package.

(g) Position audiometers on cabinet shelves as indicated in Figure 2-1. Record serial numbers in Table 2-1.

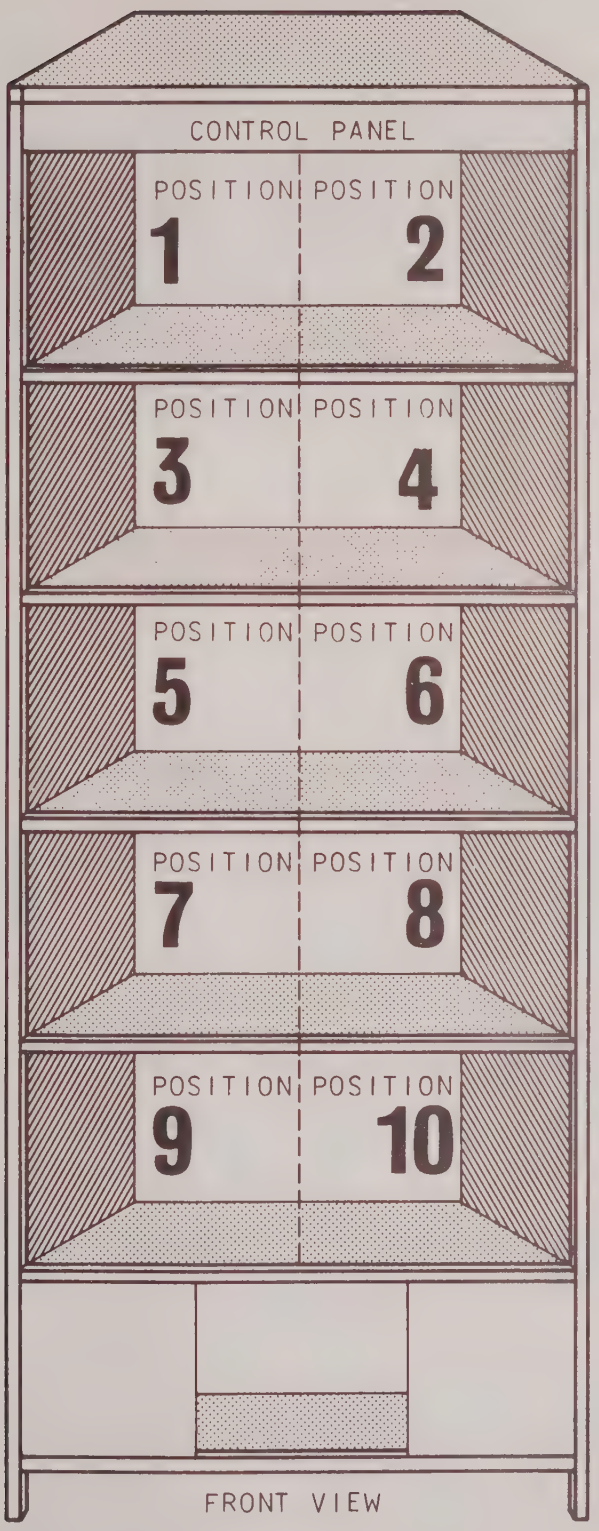


Figure 2-1. Cabinet Positions for Automatic Recording Audiometer Model ARJ-4A

A6-106-21

(h) Set all audiometer power switches to OFF position.

(i) Attach appropriate connectors from each audiometer (earphone plug, handswitch plug and start-stop plug) to Group Audiometer cable harness.

(j) Roll up excess cord.

(k) Insert each audiometer power plug to a-c strip of cabinet.

2-5 BOOTH WIRING INSTALLATION

2-6 The following steps provide the wiring installation procedures for the testing booth associated with the Group Automatic Recording Audiometer Model ARJ-4A

(a) Connect the 44 pin connectors from rack to appropriate connectors mounted on outside of booth.

(b) Unpack booth cables and transfer them inside booth.

(c) Connect booth cables to appropriate connectors mounted on inside of the booth.

(d) Locate phone and handswitch cables corresponding to station 1. (Cables should be marked with a Tag 1 for phones and tag 11 for handswitch.)

(e) Mount junction box at appropriate booth wall position and wire phone and handswitch sockets for station 1 as per booth wiring schematic.(TRACOR Drawings 9403 and 9404)

(f) Install stainless steel plate and press supplied label (marked 1) to face of plate.

(g) Repeat steps (d), (e) and (f) above for remaining stations, taking care to bundle and clamp cables to the booth wall where necessary. (Phone cables are marked with single digits and handswitch cables are marked with double digits.)

(h) When all receptacles have been secured, extract phones and handswitches from each audiometer and plug in to numerically marked positions. Example: Audiometer No. 1 should be located at cabinet position No. 1. Phones for Audiometer No. 1 (tagged with the numeral 1) should be plugged to station No. 1 in booth.

TABLE 2-1

SERIAL NUMBER RECORD

Cabinet Position	Audiometer S/N	Left Headphone S/N	Right Headphone S/N
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

SECTION III

OPERATION

3-1 INTRODUCTION

3-2 The Rudmose Group Automatic Recording Audiometer Model ARJ-4A is composed of individual Rudmose Automatic Recording Audiometer units and may be operated without special audiological training. This section provides operating procedures for the group, instructions for administration of audiometric tests, practice periods, and emergency stop.

3-3 RUDMOSE GROUP AUTOMATIC RECORDING AUDIOMETER OPERATION PROCEDURE

3-4 Operating procedures for the Group Automatic Recording Audiometer are contained in paragraphs 3-5 through 3-8.

3-5 PRELIMINARY PROCEDURES

3-6 The group Audiometer operates from a 115 volts, a-c 50-60 Hz source. Ensure that the POWER switch on the control panel and on each audiometer unit are in the OFF position before proceeding.

3-7 STEP-BY-STEP-PROCEDURES

3-8 To operate the Rudmose Group Automatic Recording Audiometer, proceed as follows:

(a) Plug main AC power cord into a convenient outlet.

(b) Ensure that earphone plug, handswitch plug, start-start plug, and AC power cord for each audiometer unit have been installed. (Refer to paragraph 2-4 of Section II.)

(c) Ensure that each position in the booth has the correct headset and handswitch.

NOTE

Each heaset must be marked with the same number as its receptacle, and each audiometer unit should be located in the correct cabinet position. (Refer to paragraph 2-5 of Section II). Interchanging the audiometer units and headsets will affect the calibration of the audiometer unit.

(d) At the control panel, place PRACTICE switch to OFF.

(e) Place POWER switch to ON. Lamp next to POWER switch should light.

(f) At each audiometer unit in use, place POWER switch to GROUP.

(g) Operate each audiometer unit by following instructions outlined in Section II of Appendix A.

3-9 ADMINISTRATION OF AUDIOMETRIC TESTS

3-10 Each table used in the test should have an audiogram card installed and pushed to the rear with the table motor engaged. Audiometer units not in use should have the POWER switches turned off and table motors locked in the up position. To administer an audiometric test, proceed as follows:

(a) Instruct subject and position headset using procedures outlined in Section II of Appendix A.

(b) At control panel, momentarily place TEST switch to START. (Switch will automatically return to center position.)

(c) Test should proceed as outlined in Section II of Appendix A.

3-11 PRACTICE PERIOD PROCEDURES

3-12 A practice period for all tables may be initiated by placing the PRACTICE switch, located on the control panel, to the ON position. With the PRACTICE switch in the ON position, all table drive motors will be stopped. When the subjects have practiced sufficiently, the PRACTICE switch on the control panel may be placed to the OFF position allowing the tables to move again and the audiometric test to resume.

3-13 EMERGENCY STOP PROCEDURE

3-14 All audiometer units may be stopped by momentarily placing the POWER switch located on the control panel to the OFF position and back to the ON position.

SECTION IV

REPLACEABLE PARTS

4-1 INTRODUCTION

4-2 This section provides data for identification of all replaceable parts in the Rudmose Group Automatic Recording Audiometer Model ARJ-4A. Table 4-1 lists the replaceable parts for the Group Automatic Recording Audiometer and table 4-2 lists the replaceable parts for the Testing Booth Accessory Assembly. Replacement parts for the individual audiometer units, ordering and servicing information, and a reference designation index are contained in Section IV of Appendix A.

TABLE 4-1

GROUP AUTOMATIC RECORDING AUDIOMETER REPLACEABLE PARTS LIST

TRACOR STOCK NO.	DESCRIPTION	FSCM	MFR. PART NO.
CABINET ASSY	P/N 9251		
9339	Duct Wire	19397	9339
9338	Plug Strip	19397	9338
HARNESS ASSY	P/N 9336		
3819-0271	Conn MS Type	02660	MS 3106A-44-1S
3819-0272	Conn MS Type	02660	MS 3106A-44-1SW
3823-0011	Clamp	02660	MS-3057-32A
3648-1005	Conn Plug Elec	71785	P-304-CCT
3648-1003	Conn Plug Elec	71785	P-303-CCT
3758-0016	Conn Plug 3 Cond	82389	297 Littel-Plug
CONTROL PANEL ASSY	P/N 9335		
3459-0011	Conn Jack	82389	23E
3459-0002	Conn Recpt	02660	160-2
3488-0001	Holder Fuse	71400	HKP
3487-0100	Fuse 10A	71400	MIL-F-15160/2
3755-0008	Switch Tele 3 Pos	82389	16036
3755-0011	Switch Tele 3 Pos	82380	160312
3756-0002	Knob Red	82389	M-1178-1
3756-0010	Knob Blk	82389	M-1178-2
3906-1413	Holder Lamp	72765	5200-232-604 Red
3906-2413	Holder Lamp	72765	5200-232-604 White
3906-5413	Holder Lamp	72765	5200-232-604 Amber
87-0521	Lamp Bulb	08806	NE-51 H
3890-0066	Capacitor 4 MFD	14655	BBR4-250
3903-0067	Relay	77342	KA 11 AY-110 VDC
3903-0811	Relay	77342	KA11AY
800-3255	Diode, 1N 3255	02735	TN 3255

TABLE 4-2

TESTING BOOTH ACCESSORY ASSEMBLY REPLACEABLE PARTS LIST

TRACOR STOCK NO.	DESCRIPTION	MFR CODE	MFR PART NO.
ARJ4A GROUP AUDIOMETER 4-MAN P/N 9249-0001			
3648-1006	Conn Soc Elec	71785	S-304-CCT
3467-0016	Cable Power	70331	636
BOOTH ACCESSORY ASSY (4-MAN) P/N 9250-0001			
3819-0269	Conn MS Type	02660	MS3106A-44-1P
3823-0011	Clamp	02660	AN3057-32A
3455-0833	Clamp Cable ¼	83330	833
3455-0835	Clamp Cable 3/8	83330	835
3455-0837	Clamp Cable ½	83330	837
3455-0839	Clamp Cable 5/8	83330	839
749084	Plate "J" Box	19397	749084
4175-0001	Box Recept Mtl	79725	5748-S
3448-0011	Jack Phone Open Ckt	82389	Littel-Jax 12B
3648-0004	Conn Soc Elec	71785	S-303-AB
ARJ4A GROUP AUDIOMETER 6-MAN P/N 9249-0002			
3648-1006	Conn Soc Elect	71785	S-304-CCT
3467-0016	Cable Power	70331	636
BOOTH ACCESSORY ASSY (6-MAN) P/N 9250-0002			
3819-0269	Conn MS Type	02660	MS3106A-44-1P
3819-0270	Conn MS Type	02660	MS3106A-44-1PW
3823-0011	Clamp	02660	MS3057-32A
3455-0833	Clamp Cable ¼	83330	833
3455-0835	Clamp Cable 3/8	83330	835
3455-0837	Clamp Cable ½	83330	837
3455-0839	Clamp Cable 5/8	83330	839
749084	Plate "J" Box	19397	749084
4175-0001	Box Recept Mtl	79725	5748-S
3448-0011	Jack Phone Open Ckt	82389	Littel- JAX 12B
3648-0004	Conn Soc Elec	71785	S-303-AB

TABLE 4-2 CONTINUED

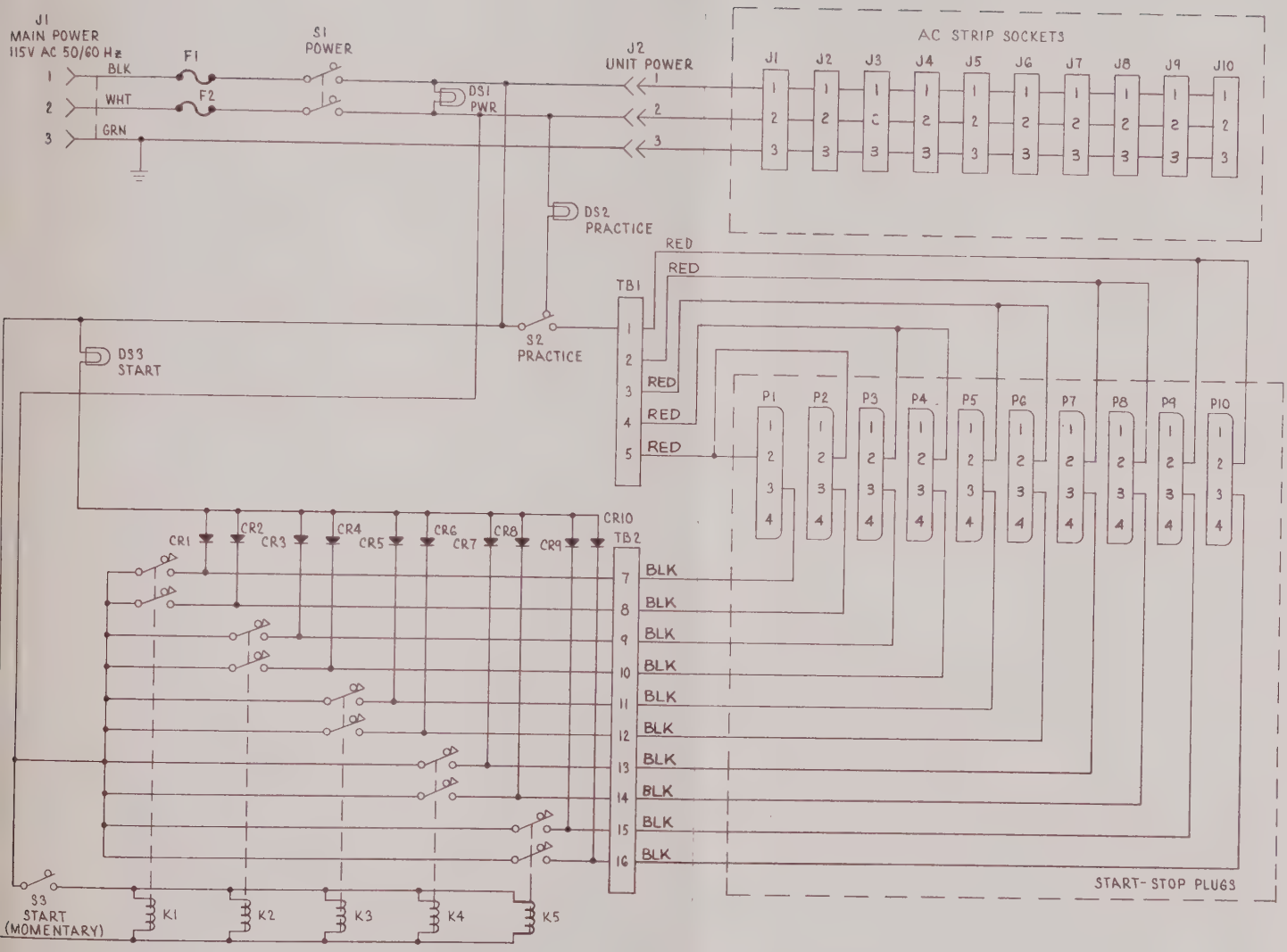
TRACOR STOCK NO.	DESCRIPTION	MFR CODE	MFR PART NO.
ARJ4 GROUP AUDIOMETER 8-MAN P/N 9249-0003			
3648-1006	Conn Soc Elec	71785	S-304-CCT
3467-0016	Cable Power	70331	636
BOOTH ACCESSORY ASSY (8-MAN) P/N 9250-0003			
3819-0269	Conn MS Type	02660	MS3106A-44-1P
3823-0011	Clamp	02660	AN3057-32A
3455-0833	Clamp Cable ¼	83330	833
3455-0835	Clamp Cable 3/8	83330	835
3455-0837	Clamp Cable ½	83330	837
3455-0839	Clamp Cable 5/8	83330	839
749084	Plate "J" Box	19397	749094
4175-0001	Box Recept Mtl	79725	5748-S
3448-0011	Jack Phone Open Ckt	82389	Littel-Jax 12B
3648-0004	Conn Soc Elec	71795	S-303-AG
3455-0841	Clamp Cable 3/4	83330	841
3455-0842	Clamp Cable 7/8	83330	842
3819-0270	Conn MS Type	02660	MS3106A-44-1PW
ARJ4A GROUP AUDIOMETER 10-MAN P/N 9249-0004			
3648-1006	Conn Soc Elec	71785	S-304-CCT
3467-0016	Cable Power	70331	636
BOOTH ACCESSORY ASSY (10-MAN) P/N 9250-0004			
3819-0269	Conn MS Type	02660	MS3106A-44-1P
3823-0011	Clamp	02660	AN3057-32A
3455-0833	Clamp Cable ¼	83330	833
3455-0835	Clamp Cable 3/8	83330	835
3455-0837	Clamp Cable ½	83330	837
3455-0839	Clamp Cable 5/8	83330	839
749084	Plate "J" Box	19397	749084
4175-0001	Box Recept Mtl	79725	5748-S
3448-0011	Jack Phone Open Ckt	82389	Littel-Jax 12B
3648-0004	Conn Soc Elec	71785	S-303-AB
3455-0841	Clamp Cable 3/4	83330	841
3455-0842	Clamp Cable 7/8	83330	842
3819-0270	Conn MS Type	02660	MS3106A-44-1PW

SECTION V

DRAWINGS

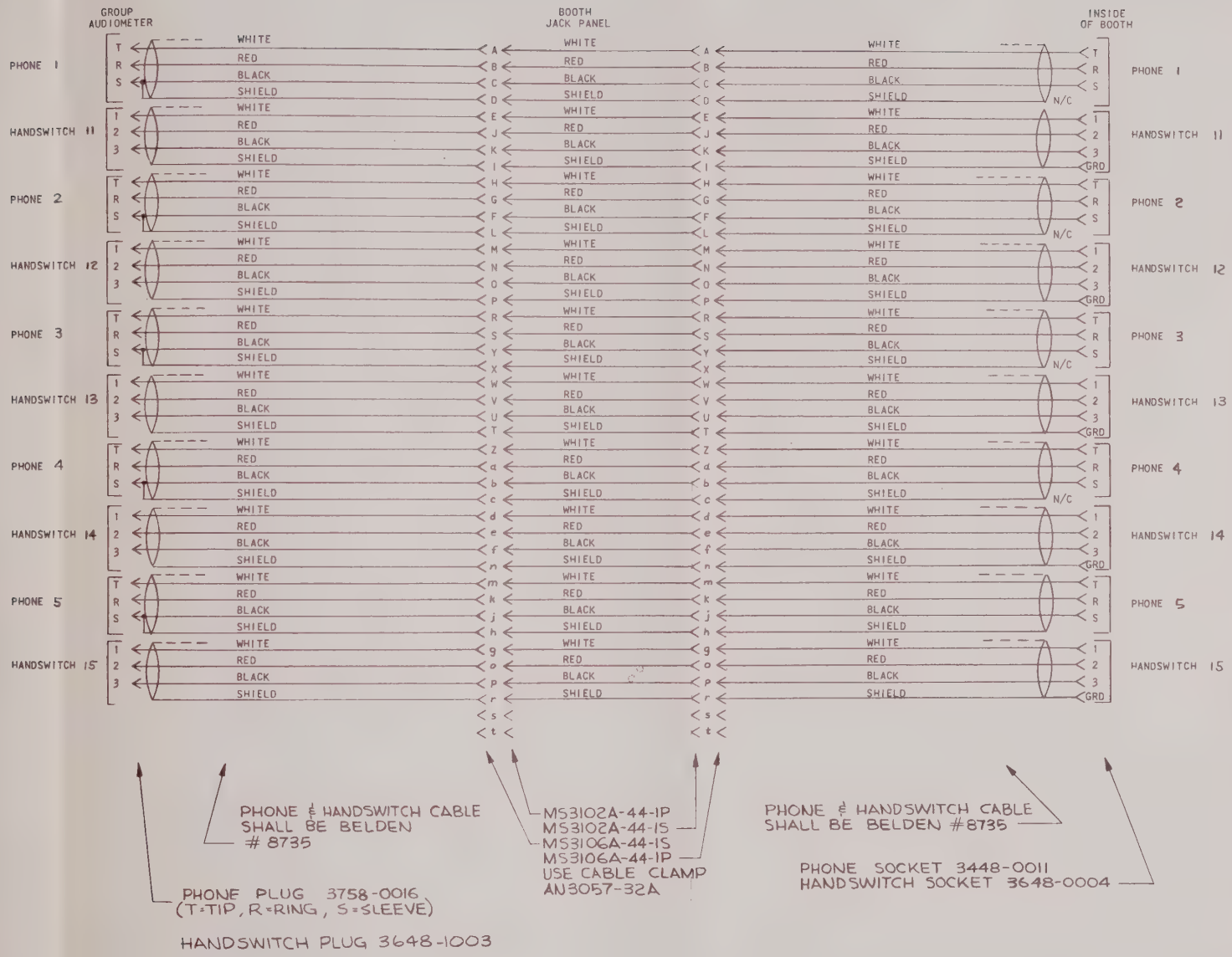
5-1 INTRODUCTION

5-2 This section contains the control panel schematic and booth interconnection diagrams for the Rudmose Group Automatic Recording Audiometer Model ARJ-4A. Diagrams for the Rudmose Automatic Recording Audiometer unit are contained in Section V of Appendix A.



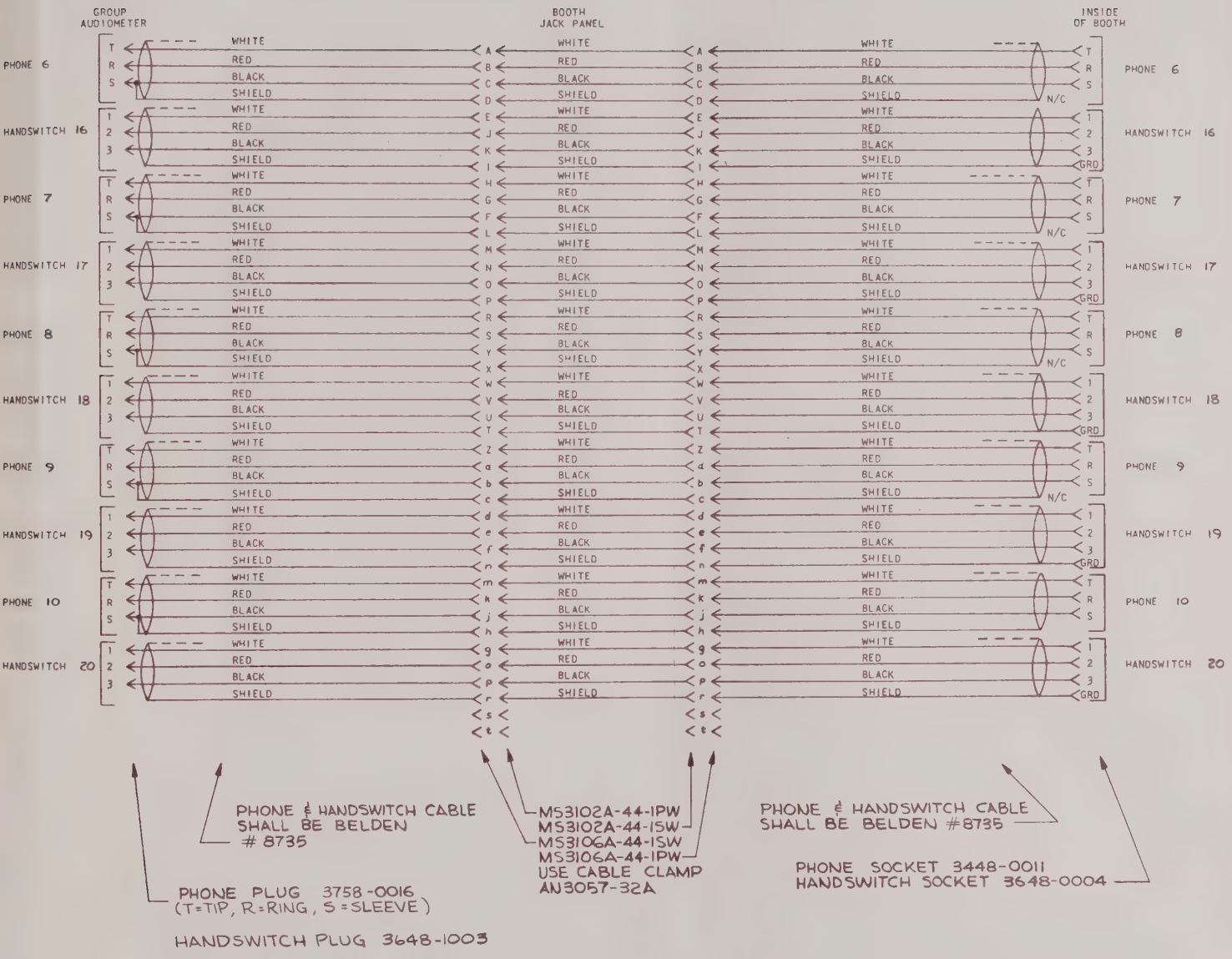
GROUP AUTOMATIC RECORDING
AUDIOMETER CONTROL PANEL,
SCHEMATIC DIAGRAM

9392



GROUP AUTOMATIC RECORDING AUDIOMETER BOOTH, INTERCONNECTING DIAGRAM

9403 (Sheet 1 of 2)



GROUP AUTOMATIC RECORDING AUDIOMETER BOOTH, INTERCONNECTING DIAGRAM

9404 (Sheet 2 of 2)

RUDMOSE AUTOMATIC RECORDING AUDIOMETER MODEL ARJ-4A OPERATION AND SERVICE MANUAL

A-1 INTRODUCTION

A-2 This appendix contains the operation and service manual for the Rudmose Automatic Recording Audiometer Model ARJ-4A.

TRACOR RUDMOSE
ARJ-4A
AUTOMATIC RECORDING AUDIOMETER

SERVICE MANUAL 6916 D

SERIAL NUMBER _____

April 1976

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Figure 1-1. RUDMOSE ARJ-4A AUTOMATIC RECORDING AUDIOMETER

RUDMOSE ARJ-4A
AUTOMATIC RECORDING AUDIOMETER

SECTION I

1. INTRODUCTION

The self-recording automatic audiometer provides excellent results in industrial settings. It reduces technician error and demands less of the technician during actual testing. One technician can simultaneously test up to ten persons with ten ARJ-4A units, a group control unit, and appropriate test booths.

1.1 GENERAL DESCRIPTION

The Rudmose ARJ-4A is a discrete frequency Bekesy audiometer which automatically (or manually) records an individual's pure tone air conduction thresholds on an audiogram card. Special audiological training is not required to operate the Rudmose ARJ-4A. Once the test has begun, it continues without further attention or supervision. A test may be interrupted by the operator or presented manually (as opposed to automatically) at any time. The operator is always in control of the audiometric examination.

The subject responds to the test (1) by pressing a handswitch button during the period of time he can hear the pure tone signal and (2) by releasing the button during the period of time he cannot hear the tone signal. The subject faces a card on which is printed "Press and hold as long as you hear . . . . release when you don't." While the button is depressed, the test tone stimulus steadily decreases in level at the rate of 5 dB per second, until the subject can no longer hear it. When he releases the button, the test tone stimulus increases in level at the same rate until the subject again hears the tone and presses the button. At periodic intervals (30 seconds) the audiometer automatically switches to another test frequency. When one ear has been tested, the test

tones are presented automatically in the same sequence to the other ear. The subject continues this press-release response throughout the six-minute test, during which time both ears are tested separately at six frequencies covering the range 500-6000 Hz.

Every response the subject makes during his examination (typically 150 threshold crossings) is automatically recorded without the possibility of operator error. Audiometric results are automatically printed (with a two-color typewriter ribbon) on a 4" by 9" card which is synchronized in frequency with the test tone being presented. These cards may be reused (recording in a different color) for tests of comparison or reliability.

OPERATION

SECTION II

2. OPERATIONAL DESCRIPTION

The ARJ-4A is designed to permit its use by persons without special audiological training. The following discussion is non-technical and provides adequate instructions for the administration of audiometric tests.

2.1 OPERATING THE ARJ-4A

The ARJ-4A Automatic Recording Audiometer operates on 115 or 230 volts, 50-60 Hz. Before connecting the unit to electrical power, arrange for a convenient and stable mounting surface. Set all console controls to a position perpendicular to the console surface. Next, plug the earphone, handswitch, and power cord into the appropriate sockets at the rear of the ARJ-4A case (Figure 2-1). Check each plug to see that it is firmly seated for good connection.

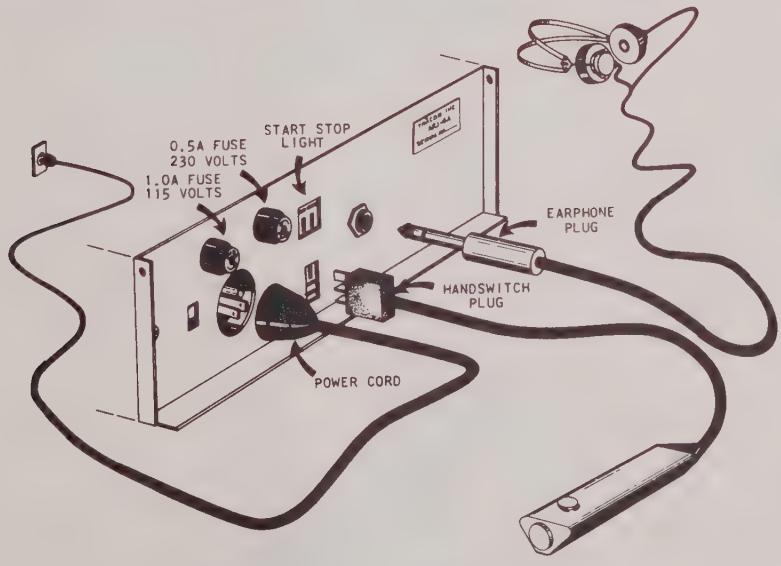


Figure 2-1. ARJ-4A BACK PANEL, SHOWING CONNECTIONS FOR HEADPHONES, HANDSWITCH, AND POWER CORD.

2.1.1 Warm-up Period

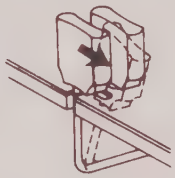
Turn the power switch to ON (center position) and the red indicator lamp should light. Allow the ARJ-4A to warm-up for one minute before beginning operation. The white indicator lamp will go on, and the red go off, when a test starts. The power switch should not be operated in the GROUP (up) position unless the unit is part of a group.

2.1.2 Recording Ribbon Color

To change the recording color, push or pull the Ribbon Color Selector as shown in Figure 2-3.

2.1.3 Positioning the Audiogram Table

Squeeze and move front Table Shift Lever (in the direction shown in the drawing at the right) to release the table for movement. This control disengages the table motor gear from the rack. The ARJ-4A need not be turned on to position the audiogram table.



2.1.4 Positioning the Audiogram Card

Press the Table Shift Lever as indicated above and pull the table out smoothly until it stops. Slip the end of the audiogram card under the typewriter ribbon guide and press the two holes in the audiogram card firmly down over the two buttons on the audiogram table. Then, again using the Table Shift Lever, push the table all the way in until it stops. When the table stops, the recording ribbon is directly over the line of numbered boxes at the start of the "Left Ear" part of the audiogram card. The table is now in position to begin a test. (See Figure 2-3)

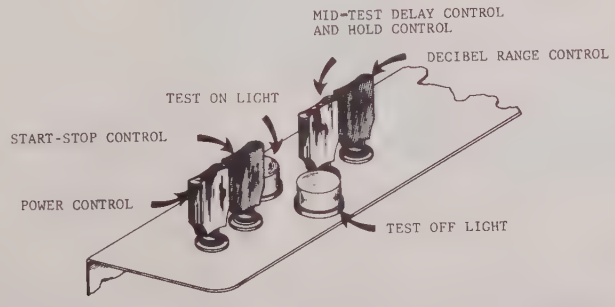


FIGURE 2-2. ARJ-4A LIGHTS AND CONTROLS

2.1.5 Mid-Test Delay

The mid-test delay is an additional feature of the ARJ-4A audiometer and is normally used for the protection of persons who might have a high-frequency hearing loss. This control, when placed in the mid-delay position, causes a delay of approximately ten seconds in the middle of the automatic test sequence just before the stimulus changes from the left ear (6000 Hz) to the right ear (500 Hz). For subjects with considerable hearing impairment at 6000 Hz in the left ear, the right ear is protected from an unduly loud 500 Hz tone which would occur automatically if the mid-test delay were not used.

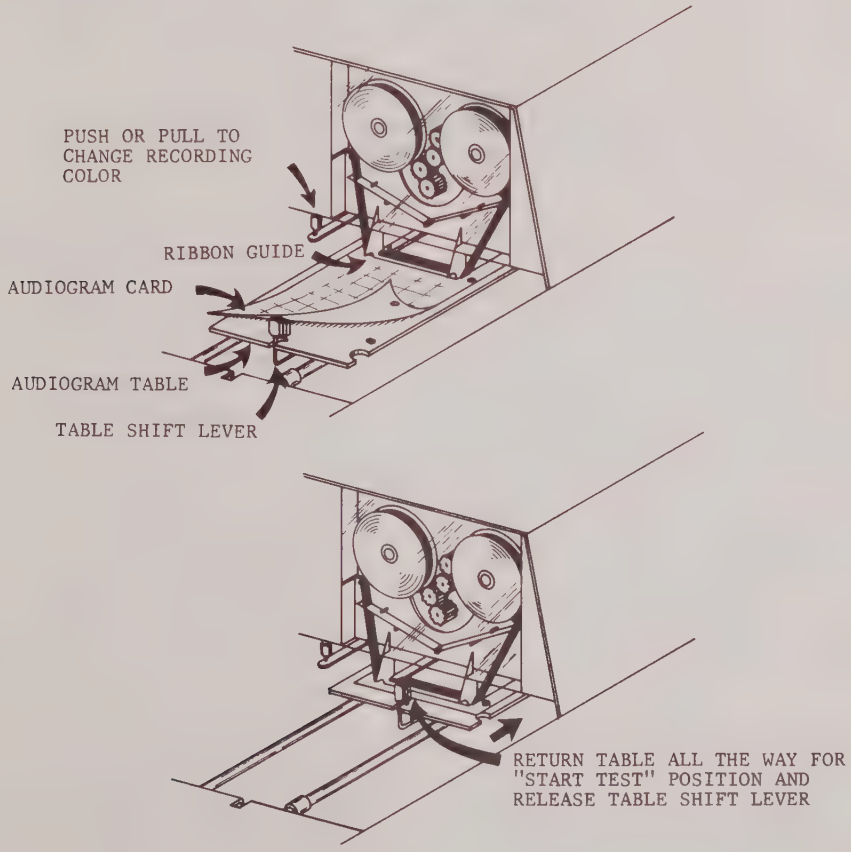

PUSH OR PULL TO CHANGE RECORDING COLOR
RIBBON GUIDE
AUDIOGRAM CARD
AUDIOGRAM TABLE
TABLE SHIFT LEVER
RETURN TABLE ALL THE WAY FOR "START TEST" POSITION AND RELEASE TABLE SHIFT LEVER

FIGURE 2-3. POSITIONING THE AUDIOGRAM TABLE

2.2 TESTING THE SUBJECT

Instruct the subject in the use of the handswitch. Some operators have found it sufficient to give the simple instruction: "Hold the button down while you can hear the tone; release it when you can't." Each operator will soon determine which instructions are best for his subjects.

2.2.1 Using the Earphones

Be sure the earphones are correctly positioned. The rubber cushions must be centered on the ears, and the headband adjusted to give a snug fit over the top of the head. The earphones are color coded (right is red; left is blue). Be certain these are correctly positioned on the subject's head.

W A R N I N G

HEADSETS ARE NOT INTERCHANGEABLE IN AUDIOMETERS

2.2.2 Beginning the Test

To begin the test, position the TEST button to START (it automatically returns to center position). The ARJ-4A is programmed to administer the whole test automatically. The complete test takes six minutes and requires the subject's undistracted attention. Observe for a few seconds during a practice period or at the beginning of the test and be certain that the subject has understood the operating instructions and is operating the handswitch properly. If this is not the case, stop the test by positioning the TEST button to STOP; then re-position the Audiogram Table, reinstruct the subject and begin again.

2.2.3 Practice Period. To give the subject a practice period (during which the ARJ-4A operates, but results are not recorded), position the TABLE switch to HOLD. To begin the automatic sequence (or to return to the sequence) after a practice period, position the TABLE switch to MID-DELAY or RUN.

2.2.4 Validity Test. A simple test for the validity of the examination is provided by the presence of the 10 dB attenuation lever (Decibel Range Control) which can be used without the subject's knowledge. This operation changes the signal level by 10 dB (to -10 to 90 dB HTL) and should cause a corresponding 10 dB change in the subject's threshold.

2.3 THE AUDIOGRAM

The results of the subject's responses are automatically recorded on a 4" x 9" audiogram card which is carried on a slowly moving slide table. The card is locked in positive synchronization with the testing tone and reflects the exact stimulus pattern traced back and forth across the subject's hearing threshold for each frequency.

Properly identified and filed the audiogram card furnishes a convenient, permanent record for comparison with future tests. When professionally interpreted, the Rudmose audiogram is legally valid evidence of a subject's hearing acuity.

2.3.1 Interpreting the Audiogram

The peaks on the audiogram represent the points at which the subject signaled he could no longer hear the tone; the valleys represent the points at which the subject signaled he could hear the tone. If the swings represent 10 dB or less, the threshold for a given frequency is determined by averaging the peaks and valleys, rounded to the nearest 5 dB. See Figure 2-4: left ear, 500 through 4000 Hz; right ear, 6000 Hz.

If all, or almost all, excursions for the same ear are greater than 10 dB, for the threshold at a given frequency, obtain the average of the peaks (rounded to the nearest 5 dB) and add 5 dB to that average. See Figure 2-4: right ear, 500 through 4000 Hz.

If one or more of the high frequencies show large swings and the low frequencies show smaller swings (on the order of 10 dB), for the threshold at the frequency(s) having excursions greater than 10 dB, average the valleys (rounded to the nearest 5 dB) and substract

10 dB from that figure. See Figure 2-4: left ear, 6000 Hz.

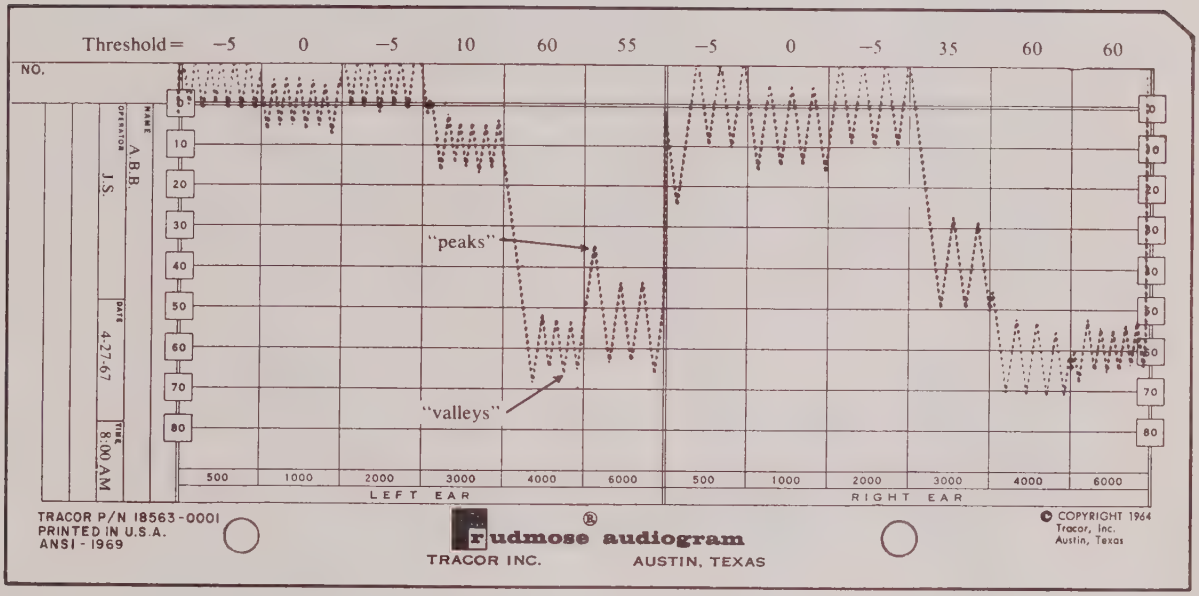


Figure 2-4 THE AUDIOGRAM CARD

TECHNICAL DESCRIPTION

SECTION III

3. PURPOSE AND SCOPE

This circuit description provides the purchaser of the Rudmose ARJ-4A Audiometer with sufficient data for servicing the instrument. If major problems are encountered, it is recommended that the instrument be returned to the factory or to one of the Manufacturer's representatives for servicing and repair. On the other hand, a competent serviceman can restore the instrument to normal use with the aid of a complete circuit description and set of schematics. The modular construction of the ARJ-4A, as shown in Figure 3-1, is closely followed in the circuit description. The Power Supply, Oscillator, Recording Unit, and Controls are covered as separate entities.

3.1 POWER SUPPLY

The ARJ-4A Audiometer can be powered from a voltage line of either 115 or 230 volts, 50-60 Hz, see Figure 3-2. Although the power receptacle is located on the rear panel, all of the power supply circuits are located within the oscillator assembly.

3.1.1 Primary Connections

The 115/230 switch (S8) is located adjacent to the POWER receptacle on the rear panel. Regardless of which line voltage is selected, power is supplied to the line voltage switch through the ON/OFF switch, S3, located on the control panel. This line is fused at the receptacle by the 1.0 ampere fuse. For 230 volt operation, S8 connects the line voltage to an additional 115 volt tap on the transformer.

3.1.2 Secondaries

Voltages at all secondary taps should remain approximately the same for 115 volt and 230 volt operation. Approximately 208 VDC is supplied by rectifying and filtering the 480 VAC from transformer T1. This is the plate voltage for the two tubes in the

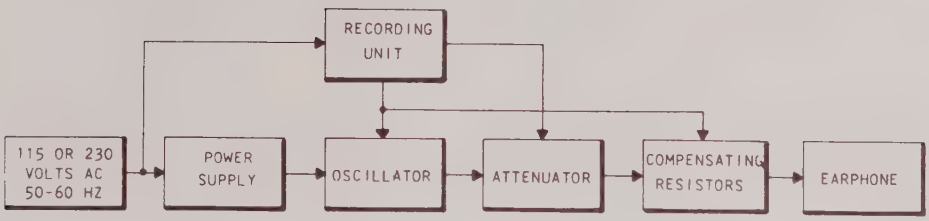


FIG. 3-1-BLOCK DIAGRAM, ARJ-4A AUDIOMETER

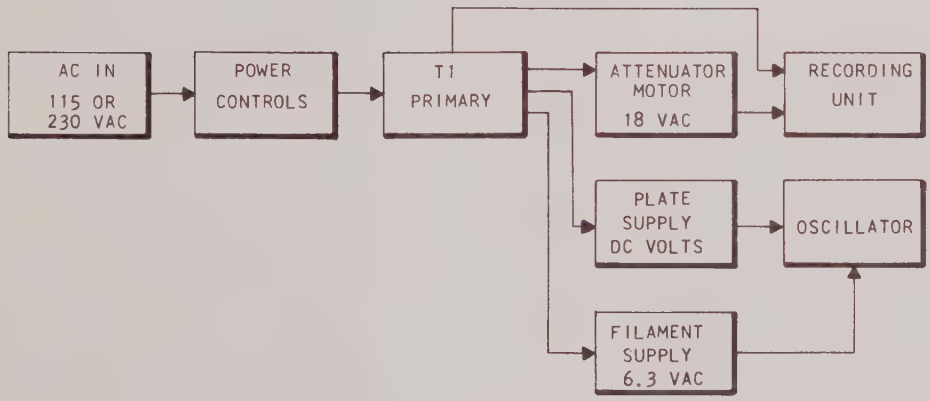


FIG. 3-2-BLOCK DIAGRAM, ARJ-4A POWER SUPPLY

oscillator assembly. The filament supply winding (6.3 volts at 5 amps) is supplied by transformer T1. Tubes in the oscillator assembly are supplied from this winding. In addition, a separate winding (18.0 volts rms at 2 amps) is provided to drive the attenuator motor located on the Recording Unit.

3.2 OSCILLATOR

The Wien bridge oscillator, located in the oscillator assembly, is adjusted to produce test signals at discrete frequencies of 500, 1000, 2000, 3000, 4000, and 6000 Hz. Frequency of the test signal is changed by symmetrically altering the resistance arms of the bridge. As indicated in Figure 3-3, a Ledex rotary switch is used to select frequency-determining components, as well as to control other related functions.

3.2.1 Oscillator Control Circuit

The Ledex switch is a ganged rotary switch consisting of three wafers on a common shaft. The shaft is controlled by the homing wafer, S1A, an interrupter switch, and a ratchet assembly, and rotates through 30° each time power is applied across the solenoid coil from the recording assembly program switch. A silicon bridge rectifier, PS1, whose 115 volt supply is fused separately on the oscillator assembly, supplies direct current to the solenoid coil.

When power is applied to the coil through the interrupter switch, the armature will turn until power is removed by the action of wafer S1A. One position on the rotor of wafer S1A is open. Thus, each time the rotary switch is energized through the program switch, the homing wafer will turn until the open position corresponds to the shorted contact on the program switch.

Wafer S1C (whose common arms are always in step with the open position on S1A) contains resistors R14 through R19 and R21 through R26. The six test frequencies are produced by selecting resistance values on S1C to form the balanced bridge.

3.2.2 Oscillator Circuit

V1, a 6SJ7 pentode, is capacitively coupled to V2, a 6AU5GT

pentode used for high mutual conductance with a relatively low voltage supply. The output of V2 is coupled back to the input of V1 through C3 and the RC bridge formed by C4, C5, C6, R14 through R19 and R21 through R26. Since positive feedback to the grid of V1 is greatest at the balance point of the bridge, the bridge is the principal element that controls the frequency.

The lamp, RT1, in the cathode circuit of V1 is a stabilizing resistance used to hold the oscillator output voltage constant over a wide range of operating conditions. As the output voltage increases, the increased current in the cathode circuit causes the tungsten filament of the lamp to heat, thus increasing its resistance and changing the bias on V1. The feedback to RT1 provides control, through R8, for the waveform as well as the amplitude of the output. Capacitor C6 provides adjustment for shifting the frequency of oscillation over a limited range. Frequency should remain constant within ±2.0% as line voltage varies between 105 and 125 volts AC, 50-60 Hz.

3.2.3 Voltage and Frequency Adjustment

The output voltage and frequency of the oscillator can be varied over an adequate range for calibration purposes by adjustment of R8 and C6, respectively. Both R8 and C6 are properly adjusted at the factory and should never be altered in the field unless adequate laboratory facilities are available. TRACOR will furnish on request information concerning calibration equipment and procedure.

3.3 RECORDING ASSEMBLY

The oscillator assembly is connected through a cable to the Recording Assembly. Located on the recording assembly are the connection panel (rear), the recorder, and the control panel (front). Of basic importance is the recording mechanism, consisting of an attenuator and motor, a printing stylus, a ribbon mechanism and motor, and a sliding table and table drive motor (see Figure 3-4). The stylus, geared to the attenuator motor through a mechanical transmission system, prints upon an audiogram card through a typewriter ribbon. Lateral movement of the stylus corresponds to the intensity

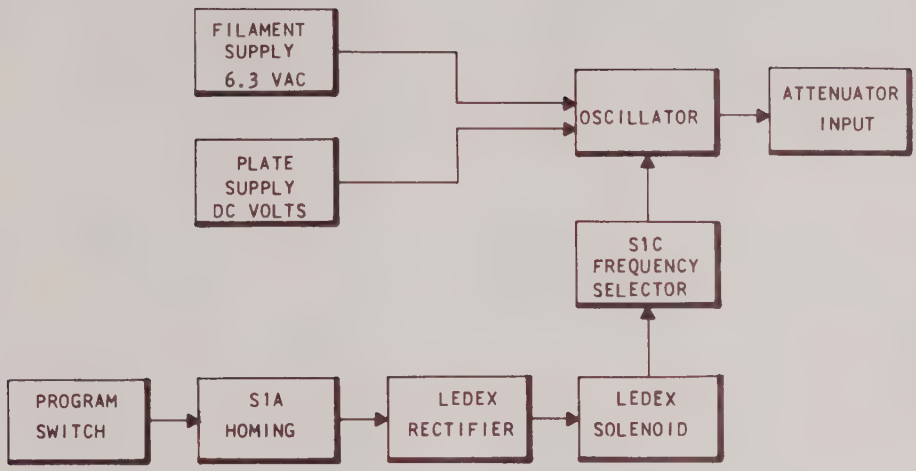


FIG. 3-3-BLOCK DIAGRAM, ARJ-4A OSCILLATOR ASSEMBLY

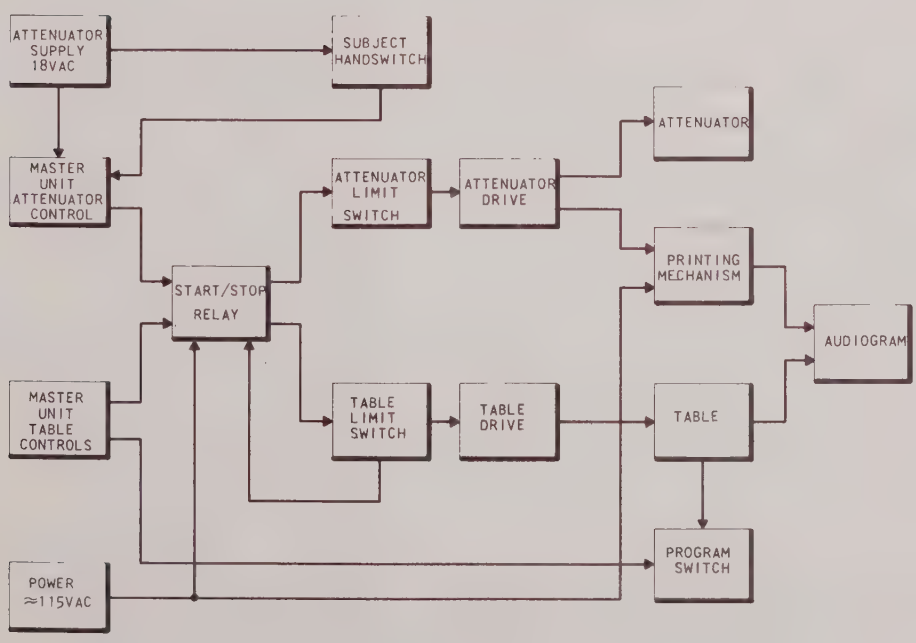


FIG. 3-4- BLOCK DIAGRAM, ARJ-4A RECORDING UNIT

of the test signal as determined by the attenuator in response to the subject's use of the handswitch. Forward movement of the table upon which the audiogram card rests corresponds to the sequence of frequencies presented in the test signal as provided by the linear program switch attached to the table. Thus, the audiogram is a continuous graph of decibels of hearing loss versus frequency.

3.3.1 The Attenuator

The attenuator is a linear ladder unit, continuously variable from 0 to 100 dB. It is wirewound, with a nominal input and output impedance of 100 ohms and an insertion loss of approximately 6 DB. A wipee is driven by the attenuator motor, B1, to alter the signal level supplied from the oscillator, by shorting between the winding and the attenuator input. The attenuator motor, B1, is a 24 volt, 1.0 amp unit, which is driven at 18.0 volts for optimum reversability characteristics. The two windings of the motor are in mechanical quadrature with a capacitor provided to produce current at the proper phase angle for the start winding.

3.3.2 Attenuator Operation

As stated in Section 3.3.1, the direction in which the attenuator motor, B1, turns is determined by the winding in which the starting capacitor is located. With the subject's handswitch operable and released, power is applied to the "decrease" winding directly and to the starting ("increase") winding through the capacitor. Depressing the handswitch applies power to the opposite winding and the rotation of the motor is reversed. Thus, the motor rotates to increase the signal strength from the oscillator (decrease attenuation) when the handswitch is released and to decrease the signal (increase attenuation) when the handswitch is depressed.

3.3.3 Stylus Control

A lead screw, geared to the attenuator through a system of pulleys and belts, moves a nut block that carries the wiper along the attenuator. Attached to the other side of the nut block is a printing stylus. Thus, when the wiper, attenuator, and stylus are aligned,

the position of the stylus must always correspond to the attenuation. As the motor armature and assembly turns, a cam at one end of the lead screw forces a rocker arm to strike the flexible length of the stylus with each turn of the lead screw. The stylus moves laterally at a speed of approximately 5 dB/sec.

3.3.4 Stylus Limit Switches

Lateral movement of the stylus and attenuator wiper is limited by switches S1 and S2, which are automatically actuated to stop the attenuator motor at either extreme of stylus movement. S2 is adjusted to limit the decrease of signal so that there is maximum attenuation at the time the attenuator motor is stopped.

3.3.5 Ribbon Mechanism

The stylus prints on the audiogram card by pressing on a typewriter ribbon through the ribbon guides, resulting in a test record of closely spaced dots. The ribbon is driven by the ribbon motor, B2, a 117 volt, 2.7 watt, 4 rpm unit that is powered from the AC source. The ribbon motor runs whenever S3 is ON, whereas operation of attenuator and table mechanisms must be programmed. B2 and its transmission are designed so that the direction of rotation is reversed by a light opposing torque. When the spool that feeds the ribbon is exhausted, a metal eyelet near the end of the ribbon will depress the ribbon guide and move the toggle gear to engage the gear on the exhausted spool, making it the takeup spool. Engagement of the toggle gear also supplies the opposing torque that reverses the direction of the ribbon motor. Thus, maximum use is made of the ribbon automatically.

3.3.5.1 The ribbon on the ARJ-4 should be replaced as soon as the printing on the audiogram card becomes too light. The replacement ribbon recommended by the factory is a heavily inked, black and red Miller-Bryant-Pierce #XXX for audiometers. Other tapes can be substituted, but it may be necessary to enlarge one of the guidance holes in the spool to ensure proper fit on the spool drive gear.

The spool fits properly when, with the center screw loose, the spool will turn freely.

To replace the ribbon, remove the plastic front panel. Starting with the spool not engaged, remove the center screw and lift the spool off of the shaft; at the same time lift the tape over the head of the guide pin. Place an old audiogram card on the table to protect it from the ink, and slide the tape out of the guide. Now remove the center screw on the other spool and remove the spool, being careful to lift the ribbon over the head of the guide pin.

Refitting is the reverse of the above. The eyelet in the tape, on the empty spool side, must be above the slot in the trip arm.

3.3.6 Table Drive

ARJ-4A's are provided with a stainless steel table unless otherwise specified. The table slides along two rods and may be moved to any position by pressing together the two knobs located at the front of the table. When the knobs are depressed, the table motor, B3, is mechanically disengaged from a stationary rack gear. The motor may be locked in the up position by moving the front knob into the slot to the right.

Power for B3 is supplied from a 115 VAC source through a coiled cable connected on the rear supporting member for the table rods. In the mormal test sequence, B3 runs until power is limited by the front limit switch, S9.

3.3.7 Table Shorting Bar

Attached to the back of the table is a shorting bar with three sets of contacts. Mounted below the table and parallel to it is a linear program switch consisting of one bar with twelve contacts and a common bar. As the table is moved either by the table drive motor or manually, the shorting bar shorts by the

series of twelve contacts in sequence to determine the frequency of the test signal produced by the oscillator (Section 3.2). The frequency of the test signal must correspond to that indicated on the audiogram card resting of the table.

3.4 CONTROLS

When S3 is pushed to the center "ON" position, power is supplied through the AC receptacle, J3, as mentioned in previous sections. After a warmup time of approximately thirty seconds, the unit is ready for operation and the table (with card installed) may be pushed to the rear and the motor engaged. Phone and handswitch connections are operative at this time.

3.4.1 Automatic Controls

When the TEST switch, S4, is pushed to the START position, K1 is energized and power is supplied to the table motor, B3, as well as the common of the handswitch and thence to the increase winding of the attenuator motor, B1. Thus, the stylus is driven forward and the 500 Hz signal begins to increase in the left earphone of the subject.

To arrive at the subject's left earphone, the signal must leave the attenuator output and pass through a compensation resistor located in the oscillator. This resistor is set at the factory to automatically compensate for both the required SPL at 500 Hz, as well as the sensitivity of the left earphone. Selection of the resistor is accomplished by routing the attenuator output through one deck on the Ledex switch. For example, as the frequency next changes to 1000 L, the compensation resistor for the left ear at 1000 Hz is automatically selected from the twelve trimpots comprising the plug-in compensation assembly. Thus, the shift to the right ear is automatically accomplished at 500 R by selecting the compensating resistor for 500 Hz on the right earphone.

The table moves forward, causing the frequency to change by directing an AC voltage through a selected wire to the Ledex homing wafer, SIA, abd thence to the coil. The attenuator and stylus are

controlled as described in Sections 3.3.1 and 3.3.3. When the table reaches the end ofthe 6000 R band, the limit switch, S9, automatically opens the line to the relay, K1, thereby de-energizing the relay and interrupting the power to the table motor, B3. In addition, the lead to the common of the handswitch is broken and power connected to the decrease winding of the attenuator motor, thereby driving both attenuator and stylus to the lowest value of HTL.

3.4.2 Auxiliary Settings

The end of test sequence described in Section 3.4.1 can be performed at any time during the test by moving the test switch, S4, to the STOP position. In this position, K1 will be de-energized.

If the table switch, S5, is in the RUN position, the normal test sequence will be observed. When S5 is moved to the HOLD position, power will be interrupted to B3 and the table will not move. In this way the subject may be permitted to practice at any time during the test.

When S5 is moved to the Mid-Delay position, the test sequence will run normally until the table reaches the end of the 6000 L band. At this point, the control wire from the program switch is used to supply power to relays K2 and K3. K2, when energized, stops the table motor, B3, and connects the attenuator common to the decrease winding. After a period of approximately 10 seconds, K3, a time delay relay, is energized, automatically de-energizing K2 and triggering the Ledex switch to advance to the 500 R position. With K2 de-energized, power is restored to the table motor and the subject handswitch and the test sequence proceeds normally. K3 de-energizes authomatically before the 1000 R band is reached and has no effect.

The lever switch, S6, is used to select the HTL range desired. When S6 is moved to the -10 to 90 dB position, a 10 dB pad is automatically inserted between the oscillator output and the attenuator input.

3.4.3 Group Configurations

When the power switch, S3, is moved to the GROUP position, the power for the table motor is disconnected from the unit supply and connected to the 4 prong plug on the rear panel. This plug, which can be used for remote indicator lamps to correspond to those on the control panel, can be connected to a group control unit. This enables the operator to remotely start the ARJ-4A as well as to hold the table for practice purposes.

REPLACEABLE PARTS
SECTION IV

4. INTRODUCTION

This section provides data for the ready identification of all replaceable parts. It consists of three indexes: the Reference Designation Index, the List of Replaceable Parts, and the Code List of Manufacturers. These indexes provide cross reference between the location within assemblies, descriptions, stock numbers, quantity, and manufacturer's names of all replaceable parts. The replacement, stocking, and ordering of maintenance and repair parts will be facilitated by the proper use of indexes.

4.1 AUDIOMETER SERVICE PROGRAM

Your Rudmose ARJ-4A Automatic Recording Audiometer is a precision instrument. As such, an effective program of preventive maintenance requires a detailed inspection, cleaning, mechanical and electrical realignment, the replacement of worn parts, electrical calibration, acoustical calibration and lubrication to be performed on your instrument semi-annually.

TRACOR maintains factory-trained, authorized service representatives throughout the United States who are capable of performing this service at your location or at a near-by service depot. Service is available on a flat fee plus parts basis. If requested, a firm quotation will be provided at the time of inspection, and work will not be processed until customer authorization is received. For uninterrupted operation of your testing program, it is possible to obtain a loaner instrument while yours is in repair.

4.2 ORDERING INFORMATION

Address orders or inquiries to either an authorized TRACOR, Inc. Sales Representative or to:

TRACOR, Inc.
Medical Instruments
6500 Tracor Lane
Austin, Texas 78721

To insure prompt service, orders must include the following information:

(1) name, model and serial number of the instrument,
(2) assembly or sub-assembly (name and/or number),
(3) the Reference Designation (or Item Designation if Reference Designation is not lised),
(4) the TRACOR Stock Number, and
(5) the full description of the part.

Item (1) is found on the instrument, item (2) may be found on either the assembly itself or in the pertinent section of the Reference Designation Index, and items (3), (4) and (5) are found in the Reference Designation Index.

The part numbers shown will change occasionally as manufacturers' items are re-evaluated or as improved components are used in production at the time the order is received, but they will be equivalent to the components they replace in both dimension and performance.

The minimum billing on any order is $15.00, with a standard delivery of 30 days. All prices are FOB Austin, Texas, and are subject to change without notice.

4.3 LIST OF REPLACEABLE PARTS

4.3.1 Contents of Index

The List of Replaceable Parts contains the following information about any part in the instrument:

(1) the Item Number,
(2) the Reference Designation,
(3) the TRACOR Stock Number,
(4) a brief description of the part, and
(5) the stock number of the assembly within which the part is found.

The index is divided into subsections corresponding to the assemblies of which the instrument is composed, and these subsections are listed in numerical order by assembly number. Parts of the given assembly are listed in the corresponding subsections as follows:

(1) parts without Reference Designations are listed first and in numeric order by Item Number, and
(2) parts with Reference Designations are listed second and in alpha-numeric order by Reference Designation.

4.3.2 Use of Index

To locate the specified part within the index, it is necessary to obtain the number and/or name of the assembly in which the part is contained. The Reference Designation, if it has one, within the assembly can be found in at least one of three places: on the assembly, on a schematic diagram, or on an assembly drawing, (see Section 5). Some parts have no Reference Designation, and these are located by their Item Numbers.

Once the assembly and Reference Designation are known, locate the pertinent subsection within the index by its numeric position, and the part within the subsection by its alpha-numeric position. Parts having Item Numbers only are found numerically by Item Numbers. Information about the part is in the row containing its Reference Designation (or Item Number).

NOTE: The use of an opaque straight-edge (e.g., a ruler or sheet

of paper) under the row being examined will reduce errors in reading multi-columnar indexes.

LIST OF REPLACEABLE PARTS DATE 08/05/76

REFERENCE DESIGNATION	TRACOR STOCK NUMBER	DESCRIPTION	TYPICAL MFGR	MANUFACTURER PART NUMBER
* * * *	ASSEMBLY NO 6815	PLATE ASSY RIBBON MTG	* * * *	
	8574	GEAR ASSY RIBBON REV	19397	8574
1	6849	PLATE RIBBON MTG	19397	6849
2	754076	POST RIBBON REV GEAR	19397	754076
3	754075	POST RIBBON	19397	754075
4	754077	POST RIBBON SPOOL MTG	19397	754077
8	3617-0101	GEAR SPUR BRASS	71041	G101
12	754083	WASHER SPRING	19397	754083
15	754073	GEAR MODIFICATION	19397	754073
16	350-0008	SCREW SET 4-40X .125	73734	HT TR STL, CUP PT
17	177-0012	SCREW BND 6-32X .187	73734	4031
18	620-0125	WASHER LOCK INT NO 6	73734	1304
19	3840-0008	RING RETAINING	96906	MIL-R-21248 MS16633-12
20	646-0058	WASHER FIBER NO 4	73734	WASHER FIBER .010 THK,.125 ID
22	175-0016	SCREW BND 4-40X .250	73734	4022
23	617-0256	WASHER FLAT NO 4	73734	1402 STL CAD PL
25	639-0015	WASHER NYLON NO 10	86928	5610-22-032
26	617-0273	WASHER FLAT NO 8	73734	1408 STL CAD PL
27	620-0126	WASHER LOCK INT NO 8	73734	1305
28	649-0134	NUT HEX 8-32X11/32 AF	73734	8-32X11/32AFX1/8THK CAD PL STL
29	24171-0001	LUBRICANT OIL	17870	DAVEN OIL
A 1	754060	GEAR MOTOR IDLER ASSY	19397	754060
A 2	754057	ASSY GEAR RIBBON	19397	754057
B 2	3839-0001	MOTOR 4 RPM 115/60	14907	P03MAD0632C1YA08A-D
TB 1	3613-0011	TERMINAL STRIP	83330	863
* * * *	ASSEMBLY NO 6816	PLATE ASSY RIB SHIFT	* * * *	
1	8697	PLATE, RIBBON SHIFT	19397	8697
2	8698	PIN GUIDE RIBBON	19397	8698
3	754080	POST RIBBON REVERSE	19397	754080
4	3565-0157	ROLLPIN .125X.500	96906	MS171526
5	754079-0001	PLATE RIBBON REVERSE	19397	754079-0001
6	754079-0002	PLATE RIBBON REVERSE	19397	754079-0002
7	3840-0008	RING RETAINING	96906	MIL-R-21248 MS16633-12
8	4387-0001	SPRING	84830	LT-018C-4-L
9	3885-0004	NUT CLINCH FLUSH MTG	15653	K7000-04-6
11	6847	SPRING	19397	6847
12	3452-0045	RIVET UH 1/8X5/16	73734	MS20470 AD4-5 (MIL-R-5674)
13	4387-0002	SPRING	84830	LT-018C-4-R
14	4388-0001	KNOB SWITCH LEVER	72913	138900
16	6853	GUIDE RIBBON	19397	6853
17	175-0008	SCREW BND 4-40X .125	73734	4020
18	3855-0005	RESIN EPOXY	T0025	RING EPOXY KIT
19	646-0058	WASHER FIBER NO 4	73734	WASHER FIBER .010 THK,.125 ID
20	175-0032	SCREW BND 4-40X .500	73734	4026
* * * *	ASSEMBLY NO 6825	PLATE TABLE UNIT ASSY	* * * *	
1	6776	PLATE	19397	6776
2	6769	BLOCK TABLE SLIDE	19397	6769
3	6757	BLOCK TABLE SLIDE	19397	6757
4	7460	SPRING MOTOR	19397	7460
5	6765	MOUNT MOTOR	19397	6765
7	6836	GEAR	19397	6836
8	6777	PLATE COVER	19397	6777
9	6761	PIN LOCATING	19397	6761
10	6749	LEVER TABLE	19397	6749
11	6755	ROD TABLE	19397	6755
12	751311	SLEEVE TABLE STOP	19397	751311
13	8555	ACTUATOR	19397	8555
15	3880-5003	STANDOFF CLINCH TYPE	46384	SOS-632-8
16	177-0100	SCREW BND 6-32X1.	73734	4040
17	177-0040	SCREW BND 6-32X .625	73734	4037
18	177-0048	SCREW BND 6-32X .750	73734	4038
19	240-0016	SCREW FIL 4-40X .250	73734	2232
20	175-0016	SCREW BND 4-40X .250	73734	4022
21	175-0012	SCREW BND 4-40X .187	73734	4021
23	620-0125	WASHER LOCK INT NO 6	73734	1304
24	620-0123	WASHER LOCK INT NO 4	73734	1302
26	737-0002	NUT CAP 6-32X5/16	23050	6-32X5/16
27	350-0008	SCREW SET 4-40X .125	73734	HT TR STL, CUP PT
28	5606-0008	STANDOFF R 6-32X1/8	06540	8150-A-0632-1B
30	4750-0052	SPACER AL NO 6X13/16	06540	9233-A-140-1B
35	4239-0132	SCR PAN HD 4-40X1-1/2	96906	MS51957-23
36	639-0006	WASHER NYLON NO 4	73734	103200
37	5586-0036	STANDOFF R 4-40X9/16	06540	8082-A-0440-1B
38	4720-0020	SPACER AL NO 4X5/16	06540	9210-A-115-1B
39	3775-0101	BEARING NYLINED	32105	6N8-D
40	23633-0001	ADHESIVE GEN PURPOSE	76381	SPRA-MENT
41	177-0020	SCREW BND 6-32X .312	73734	4033
42	617-0267	WASHER FLAT NO 6	73734	1404 STL CAD PL

REFERENCE DESIGNATION	TRACOR STOCK NUMBER	DESCRIPTION	TYPICAL MFGR	MANUFACTURER PART NUMBER
43	3455-0773	CLAMP CABLE 1/4	83330	773
44	651-0017	NUT HEX 6-32X1/4 AF	73734	8005 STL CAD PL
45	3855-0005	RESIN EPOXY	T0025	RING EPOXY KIT
46	177-0024	SCREW BND 6-32X .375	73734	4034
47	175-0024	SCREW BND 4-40X .375	73734	4024
B 3	3839-0002	MOTOR 1 RPM 115/60	02770	447-1-26D-H
MP 1	3756-0010	KNOB BLK	82389	M-1178-2
MP 2	3756-0010	KNOB BLK	82389	M-1178-2
TB 3	3613-0008	TERMINAL STRIP 3 PIN	83330	830
* * *	* ASSEMBLY NO 6842	BOARD PC ASSY ADJUST	* * * *	
1	749091-0003	BOARD PCB	19397	749091-0003
R 1	3596-0202	RES VAR WW 2 K	80294	3065P-1-202
R 2	3596-0202	RES VAR WW 2 K	80294	3065P-1-202
R 3	3596-0202	RES VAR WW 2 K	80294	3065P-1-202
R 4	3596-0202	RES VAR WW 2 K	80294	3065P-1-202
R 5	3596-0202	RES VAR WW 2 K	80294	3065P-1-202
R 6	3596-0202	RES VAR WW 2 K	80294	3065P-1-202
R 7	3596-0202	RES VAR WW 2 K	80294	3065P-1-202
R 8	3596-0202	RES VAR WW 2 K	80294	3065P-1-202
R 9	3596-0202	RES VAR WW 2 K	80294	3065P-1-202
R 10	3596-0202	RES VAR WW 2 K	80294	3065P-1-202
R 11	3596-0202	RES VAR WW 2 K	80294	3065P-1-202
R 12	3596-0202	RES VAR WW 2 K	80294	3065P-1-202
* * *	* ASSEMBLY NO 6848	ASSY FINAL UPPER UNIT	* * * *	
1	6774	PLATE SIDE	19397	6774
2	6752	BRACKET LIMIT SWITCH	19397	6752
6	6750	SHAFT PULLEY IDLER	19397	6750
7	6756	PULLY ATTENUATOR MOT	19397	6756
8	6760	POST UPPER UNIT REAR	19397	6760
9	6814	POST UPPER UNIT FR	19397	6814
10	6759	SPACER UPPER UNIT	19397	6759
11	6748	SUPPORT TABLE RODS	19397	6748
15	3845-0001	BEARING FLG-TYPE BRZ	90052	FB-25-2
16	3775-0006	BEARING NYLON	93990	3-FN-5
18	751259	SPACER	19397	751259
19	751025	INSULATOR	19397	751025
20	751026	WIPER	19397	751026
21	6855	BRACKET STYLUS PLATE	19397	6855
22	641-0037	WASHER FLAT .251 ID	86928	5612-37-5
23	18944-0001	BUSHING,PEN BRKT	19397	18944-0001
24	754095	ROD PIVOT STYLUS	19397	754095
25	6846	STYLUS PLATE	19397	6846
26	754093	STYLUS PIN	19397	754093
27	6837	SPACER CAM FOLLOWER	19397	6837
28	3624-0001	LUG SOLDER NO 4	73734	3A-100
29	3842-0031	SPRING EXTENSION	84830	E1-0126-7
30	6845	ROD TETAINING	19397	6845
32	754089	PLATE ADJUST	19397	754089
33	3313-0022	NUT CLINCH SLF LKG	73734	79034 STL CAD PL
34	525-0040	SCREW FIL 10-32X .625	73734	102356
35	6936	PULLEY IDLER	19397	6936
36	3882-0003	SWITCH LEVER	91929	WZ-2RL
37	6937	PULLEY	19397	6937
38	3814-2234	GASKET O-RING NITRILE	77308	NITRILE H-70 3X3 1/4X1/8
39	3814-2142	GASKET O-RING NITRILE	77308	NITRILE H-70 2 3/8X2 9/16X3/32
41	759-0024	SCR SET FDP 10-24X3/8	73734	10-24X3/8
42	675-0024	SCR SOC SET 10-24X3/8	73734	10-24X3/8 HT TR STL
43	350-0012	SCREW SET 4-40X .187	73734	HT TR STL, CUP PT
49	665-0048	SCR PAN HD 6-32X3/4LL	03038	LP25D62S10
50	649-0154	NUT HEX 10-24X3/8 AF	73734	8012 STL CAD PL
55	638-0125	WASHER LOCK EXT NO 6	73734	1322
56	3326-0042	RIVET POP 1/8X.232	07707	AD42BS
57	3331-0027	NUT CLINCH 4-40	46384	CL-440-2 STL CAD PL
58	3840-0015	RING RETAINING	96906	MIL-R-21248 MS16633-18
61	751143	BRKT ATTN MTG	19397	751143
62	3625-2001	NUT CLINCH 4-40	46384	F-440-1
64	3845-0099	BEARING NON-FLG BRZ	90052	B34-2
65	9459	BRACKET MTG STRIKER	19397	9459
66	9460	PLATE STRIKER	19397	9460
67	3331-0022	NUT CLINCH 4-40	46384	CL-440-1 STL CAD PL
71	617-0264	WASHER FLAT NO 6	73734	1404 STL CAD PL
72	3326-0043	RIVET POP 1/8X294	07707	AD43BS
75	646-0059	WASHER FIBER NO 8	73734	104320
75	4125-0013	LUBRICANTS GEN PURP	71112	3-IN-ONE-OIL
A 1	6867	CHASSIS ASSY MOTOR	19397	6867
A 2	6815	PLATE ASSY RIBBON MTG	19397	6815
A 3	6816	PLATE ASSY RIB SHIFT	19397	6816
A 4	751318	LINEAR ATTN ASSY	19397	751318
A 5	6884	ASSY LEAD SCREW	19397	6884

LIST OF REPLACEABLE PARTS DATE 08/05/76

REFERENCE DESIGNATION	TRACOR STOCK NUMBER	DESCRIPTION	TYPICAL MFGR	MANUFACTURER PART NUMBER
C 1	3893-0003	CAP FXD MT SRT	56289	AR1208
TB 2	3613-0001	TERMINAL STRIP 1 PIN	83330	861
* * * *	ASSEMBLY NO 6867	CHASSIS ASSY MOTOR	* * * *	
1	6754	CHASSIS MOTOR MOUNT	19397	6754
2	3495-0039	GROMMET 1/4 ID	16238	J-311201-3
3	4750-0024	SPACER AL NO 6X3/8	06540	922B-A-140-1B
4	18069	BRACKET, MOTOR	19397	18069
5	3331-0031	NUT CLINCH 6-32	46384	CL-632-1 STL
6	177-0040	SCREW BND 6-32X .625	73734	4037
8	177-0100	SCREW BND 6-32X1.	73734	4040
9	620-0125	WASHER LOCK INT NO 6	73734	1304
10	617-0267	WASHER FLAT NO 6	73734	1404 STL CAD PL
12	18070	STANDOFF, MOTOR	19397	18070
13	3627-0001	CLAMP CAP VERT MTG	37942	VP 3
14	3495-0007	GROMMET 1/4 ID	77969	16
15	177-0020	SCREW BND 6-32X .312	73734	4033
16	639-0012	WASHER NYLON NO 8	73734	5610-18-032
17	3841-0058			
B 3	3831-0001	MOTOR 24VAC 60 CPS	90012	0321030
* * * *	ASSEMBLY NO 6884	ASSY LEAD SCREW	* * * *	
1	18883-0003	LEADSCREW&BUSHING	19397	18883-0003
3	18938-0001	GUIDE BLOCK	19397	18938-0001
4	751341-0002	CAM LEADSCREW	19397	751341-0002
6	3565-0005	ROLLPIN .062X.375	96906	MS171434
7	338-0008	SCREW SET 4-40X .125	73734	STL CAD PL, CUP PT
8	3863-0016	SEALANT LOCKTITE	05972	72 BRG MTG (MIL-S-22473)
* * * *	ASSEMBLY NO 6894	OSCILLATOR ASSY	* * * *	
1	6778	CHASSIS	19397	6778
16	14342-0001	CAN MODIFIED	19397	14342-0001
34	3624-0005	LUG SOLDER NO 6	73734	1950
41	3329-0019	NUT CLINCH 8-32	46384	CLS-832-2
47	3776	ADHESIVE CONTACT	86603	WELDWOOD CONTACT CEMENT
48	6893	PLATE MTG	19397	6893
49	3326-0043	RIVET POP 1/8X294	07707	AD43BS
51	705-0010	WIRE 22AWG BLK STRD	70903	8503 BLK (MIL-W-16878)
52	705-0110	WIRE 22AWG BRN STRD	70903	8503 BRN (MIL-W-16878)
53	705-0210	WIRE 22AWG RED STRD	70903	8503 RED (MIL-W-16878)
54	705-0410	WIRE 22AWG YEL STRD	70903	8503 YEL (MIL-W-16878)
55	705-0610	WIRE 22AWG BLU STRD	70903	8503 BLU (MIL-W-16878)
56	705-0810	WIRE 22AWG GRY STRD	70903	8503 GRY (MIL-W-16878)
57	705-0910	WIRE 22AWG WHT STRD	70903	8503-WHT (MIL-W-16878)
58	3426-0021	TUBING TEFLON NO 20	70331	TFT-200/20NAT
61	8819-0020	WIRE BUS BAR 20 AWG	70903	8020
63	3917-0032	FOAM SHEET 1/2 IN	04552	ECCOFOAM FS
64	3917-0016	FOAM SHEET 1/4 IN	04552	ECCOFOAM FS
66	3388-0116	CABLE COAXIAL	02660	RG-174/U (MIL-C-17/119)
67	3624-0001	LUG SOLDER NO 4	73734	38-100
68	3326-0042	RIVET POP 1/8X.232	07707	AD42BS
69	3326-0041	RIVET POP 1/8X.170	07707	AD41BS
A 1	6896	SWITCH ASSY	19397	6896
A 2	6898	WIRING HARNESS OSC	19397	6898
A 3	6842	BOARD PC ASSY ADJUST	19397	6842
C 1	3353-9203	CAP FXD MYL .02 UF	80183	4PS-520
C 2	3353-9503	CAP FXD MYL .050 UF	80183	4PS-550
C 3	3353-9102	CAP FXD MYL .1 UF	56289	220P10494
C 4	27511-0911	CAP FXD MICA 910 PFD	84171	CM20FD911GN3 (MIL-C-5/2)
C 5	27511-0911	CAP FXD MICA 910 PFD	84171	CM20FD911GN3 (MIL-C-5/2)
C 6	3785-0005	CAP VAR AIR	80583	APC-100
C 7	3482-0033	CAP FXD ELEC 30/30MFD	80183	TVL-2628 WITH MTG HARDWARE
F 1	3487-9101	FUSE 1 A 250 VOLT	75915	F02B 250V 1A
R 1	3418-0202	RES FXD WW 2 K	56289	RW57G202 (MIL-R-26)
R 2	3418-0252	RES FXD WW 2X5 K	56289	RW57G252 (MIL-R-26)
R 3	210-0152	RES FXD COMP 1.50 K	81349	RC42GF152K (MIL-R-11/7)
R 4	201-0474	RES FXD COMP 470. K	81349	RC20GF474J (MIL-R-11/3)
R 5	201-0274	RES FXD COMP 270. K	81349	RC20GF274J (MIL-R-11/3)
R 6	201-0563	RES FXD COMP 56.0 K	81349	RC20GF563J (MIL-R-11/3)
R 7	201-0272	RES FXD COMP 2.70 K	81349	RC20GF272J (MIL-R-11/3)
R 8	3522-0252	RES VAR COMP 2.5 K	44655	RV4LAYSA252A (MIL-R-94/5)
T 1	7007	TRANSFORMER POWER	19397	7007
T 2	7008	TRANSFORMER OUTPUT	19397	7008
V 1	18893-0001			
V 2	18893-0002			
CR 1	800-3255	DIODE 1N3255	02735	1N3255
CR 2	800-3255	DIODE 1N3255	02735	1N3255
PS 1	3832-0015	RECTIFIER, BRIDGE	04713	MDA1491-5
RT 1	87-1203	LAMP BULB NEON 115V	08806	356/5

REFERENCE DESIGNATION	TRACOR STOCK NUMBER	DESCRIPTION	TYPICAL MFGR	MANUFACTURER PART NUMBER
TB 1	3613-0002	TERMINAL STRIP 2 PIN	83330	862
TB 2	3613-0002	TERMINAL STRIP 2 PIN	83330	862
XF 1	3488-0001	FUSEHOLDER 1/4X1 1/4	71400	HKP
XV 1	3634-0001	SOCKET OCTAL	02660	88-8
XV 2	3634-0001	SOCKET OCTAL	02660	88-8
XPS 1	3634-0001	SOCKET OCTAL	02660	88-8
XRT 1	3900-0001	HOLDER LAMP	72765	409 AH
* * *	* ASSEMBLY NO	6895-0003	ACCESSORY PKG ASSY	* * * *
	18302-0001	HANDSWITCH ASSY	19397	18302-0001
1	3467-0016	CABLE, 3-CONDUCTOR	70903	17460
2	18738-0001	AUDIOMETRIC TEST CARD	19397	18738-0001
10	18563-0001	AUDIOGRAM CARD	19397	18563-0001
13	8659	OPERATING GUIDE BOOK	19397	8659
* * *	* ASSEMBLY NO	6896-	SWITCH ASSY	* * * *
11	3624-0005	LUG SOLDER NO 6	73734	1950
12	624-0016	SCR PAN HD 6-32X1/4	73734	23042 (MS35216-23)
13	649-0114	NUT HEX 6-32X5/16 AF	73734	6-32X5/16AFX7/64THK CAD PL STL
R 1	212-2802	RES FXD FILM 28.0 K	81349	RN60D2802F (MIL-R-10509/1)
R 2	212-1432	RES FXD FILM 14.3 K	81349	RN60D1432F (MIL-R-10509/1)
R 3	212-1432	RES FXD FILM 14.3 K	81349	RN60D1432F (MIL-R-10509/1)
R 4	212-2872	RES FXD FILM 28.7 K	81349	RN60D2872F (MIL-R-10509/1)
R 5	212-9092	RES FXD FILM 90.9 K	81349	RN60D9092F (MIL-R-10509/1)
R 6	212-2053	RES FXD FILM 205. K	81349	RN60D2053F (MIL-R-10509/1)
R 7	212-2802	RES FXD FILM 28.0 K	81349	RN60D2802F (MIL-R-10509/1)
R 8	212-1432	RES FXD FILM 14.3 K	81349	RN60D1432F (MIL-R-10509/1)
R 9	212-1432	RES FXD FILM 14.3 K	81349	RN60D1432F (MIL-R-10509/1)
R 10	212-2872	RES FXD FILM 28.7 K	81349	RN60D2872F (MIL-R-10509/1)
R 11	212-9092	RES FXD FILM 90.9 K	81349	RN60D9092F (MIL-R-10509/1)
R 12	212-2053	RES FXD FILM 205. K	81349	RN60D2053F (MIL-R-10509/1)
S 1	6965-0004	SWITCH MOTORIZED	19397	6965-0004
* * *	* ASSEMBLY NO	6897-	COVER ASSY	* * * *
1	6773	COVER TOP	19397	6773
2	6890	BRACKET	19397	6890
3	3331-0021	NUT CLINCH 4-40	46384	CL-440-1 STL
4	3327-2423	RIVET POP 1/8X.230	07707	AK423BS
5	3916-0002	LATCH BASE PLATE	19397	3916-0002
6	3855-0005	RESIN EPOXY	T0025	RING EPOXY KIT
* * *	* ASSEMBLY NO	6898-	WIRING HARNESS OSC	* * * *
1	705-0010	WIRE 22AWG BLK STRD	70903	8503 BLK (MIL-W-16878)
2	705-0110	WIRE 22AWG BRN STRD	70903	8503 BRN (MIL-W-16878)
3	705-0510	WIRE 22AWG GRN STRD	70903	8503 GRN (MIL-W-16878)
4	705-0904	WIRE 22AWG WHT/YEL	70903	8503 WHT/YEL (MIL-W-16878)
5	705-0910	WIRE 22AWG WHT STRD	70903	8503-WHT (MIL-W-16878)
6	706-0010	WIRE 26AWG BLK STRD	70903	8505-BLK (MIL-W-16878)
7	706-0110	WIRE 26AWG BRN STRD	70903	8505-BRN (MIL-W-16878)
8	706-0210	WIRE 26AWG RED STRD	70903	8505-RED (MIL-W-16878)
9	706-0310	WIRE 26AWG ORN STRD	70903	8505-ORN (MIL-W-16878)
10	706-0410	WIRE 26AWG YEL STRD	70903	8505-YEL (MIL-W-16878)
11	706-0510	WIRE 26AWG GRN STRD	70903	8505-GRN (MIL-W-16878)
12	706-0610	WIRE 26AWG BLU STRD	70903	8505-BLU (MIL-W-16878)
13	706-0710	WIRE 26AWG VIO STRD	70903	8505-VIO (MIL-W-16878)
14	706-0810	WIRE 26AWG GRY STRD	70903	8505-GRY (MIL-W-16878)
15	706-0900	WIRE 26AWG WHT/BLK	70903	8505-WHT/BLK (MIL-W-16878)
16	706-0901	WIRE 26AWG WHT/BRN	70903	8505-WHT/BRN (MIL-W-16878)
17	706-0902	WIRE 26AWG WHT/RED	70903	8505-WHT/RED (MIL-W-16878)
18	706-0910	WIRE 26AWG WHT STRD	70903	8505-WHT (MIL-W-16878)
22	3801-0001	CABLE 22AWG 7/30 STRD	70903	8771
J 1	3318-5010	CONN PC 15 CONTACTS	02660	143-015-01
J 2	3773-0009	CONN PLUG ELEC	71785	DD-50P
* * *	* ASSEMBLY NO	6899-	WIRING HARNESS ARJ4A	* * * *
1	705-0010	WIRE 22AWG BLK STRD	70903	8503 BLK (MIL-W-16878)
2	705-0110	WIRE 22AWG BRN STRD	70903	8503 BRN (MIL-W-16878)
3	705-0210	WIRE 22AWG RED STRD	70903	8503 RED (MIL-W-16878)
4	705-0310	WIRE 22AWG ORN STRD	70903	8503 ORN (MIL-W-16878)
5	705-0410	WIRE 22AWG YEL STRD	70903	8503 YEL (MIL-W-16878)
6	705-0510	WIRE 22AWG GRN STRD	70903	8503 GRN (MIL-W-16878)
7	705-0610	WIRE 22AWG BLU STRD	70903	8503 BLU (MIL-W-16878)
8	705-0710	WIRE 22AWG VIO STRD	70903	8503 VIO (MIL-W-16878)
9	705-0810	WIRE 22AWG GRY STRD	70903	8503 GRY (MIL-W-16878)
10	705-0900	WIRE 22AWG WHT/BLK	70903	8503 WHT/BLK (MIL-W-16878)

REFERENCE DESIGNATION	TRACOR STOCK NUMBER	DESCRIPTION	TYPICAL MFGR	MANUFACTURER PART NUMBER
11	705-0901	WIRE 22AWG WHT/BRN	70903	8503 WHT/BRN (MIL-W-16878)
12	705-0902	WIRE 22AWG WHT/RED	70903	8503 WHT/RED (MIL-W-16878)
13	705-0903	WIRE 22AWG WHT/ORN	70903	8503 WHT/ORN (MIL-W-16878)
14	705-0904	WIRE 22AWG WHT/YEL	70903	8503 WHT/YEL (MIL-W-16878)
15	705-0906	WIRE 22AWG WHT/BLU	70903	8503 WHT/BLU (MIL-W-16848)
16	705-0907	WIRE 22AWG WHT/VIO	70903	8503-WHT/VIO (MIL-W-16878)
17	705-0910	WIRE 22AWG WHT STRD	70903	8503-WHT (MIL-W-16878)
19	3801-0003	CABLE 22AWG 7/30 STRD	70903	8451
20	3801-0001	CABLE 22AWG 7/30 STRD	70903	8771
E 1	4299-0001	CONN ADAPT 22-18 AWG	79061	27202
E 3	3979-0001	TERMINAL LUG 22-18	96906	MS25036-101 (MIL-T-7928)
P 1	3773-0010	CONN SOC ELEC	71785	DD-50S
* * *	* ASSEMBLY NO 8574-	GEAR ASSY RIBBON REV	* * * *	
1	617-0318	WASHER FLAT NO 4	73734	96302 ST STL
2	639-0015	WASHER NYLON NO 10	86928	5610-22-032
3	3617-0101	GEAR SPUR BRASS	71041	G101
4	3841-0141	WASHER SPRING	86928	5804-14-1
6	8588	TOOL RING	19397	8588
7	8590	TOOL FLARING	19397	8590
A 1	8576	PLATE ASSY	19397	8576
* * *	* ASSEMBLY NO 8576-	PLATE ASSY	* * * *	
1	8577	PLATE RIBBON GEAR	19397	8577
2	8579	BUSHING	19397	8579
3	8578	POST RIBBON GEAR	19397	8578
* * *	* ASSEMBLY NO 9038-	EARPHONE 100 OHM	* * * *	
2	3901-0001	HEADBAND	78711	12A(TC-89E)
3	3910-0006	CORD, PHONE	82389	4C-4375
4	3909-0001	CAP EARPHONE	76101	MAICO 1042-162C (RED)
5	3909-0002	CAP EARPHONE	76101	MAICO 1042-162B (BLUE)
6	3944-0001	CUSHION EARPHONE	78711	MX41AR
7	11051-0002	PLATE IDENT EARPHONE	19397	11051-0002
8	11051-0001	PLATE IDENT EARPHONE	19397	11051-0001
A 2		EARPHONE SET ASSY	19397	9038
* * *	* ASSEMBLY NO 9607-	ASSY CONTACT ARM	* * * *	
1	4239-0024	SCR PAN HD 4-40X3/8	73734	MS51957-15
2	4189-0004	WASHER FLAT NO 4	73734	AN960C-4
3	3326-0042	RIVET POP 1/8X.232	07707	AD42BS
5	6768	BRACKET WIPER	19397	6768
6	9604	INSULATOR, WIPER	19397	9604
7	9603	CONTACT FINGER	19397	9603
8	3914-0078	WASHER LOCK NO 4	73734	MS35338-135 REPLACE MS35337-78
* * *	* ASSEMBLY NO 18302-0001	HANDSWITCH ASSY	* * * *	
2	24331-0001	GRIP, HANDLE, PLASTIC	98124	BR-6955
3	650-0067	NUT HEX 15/32-32	73734	15/32-32X.562AFX.078THK
4	18772-0001	HOUSING SWITCH	19397	18772-0001
P 1	24338-0001	CABLE PWR 6FT 2 PIN	97918	SF-515-G8
S 1	24336-0001	SWITCH PUSHBUTTON	21649	P1-32611
* * *	* ASSEMBLY NO 751318-	LINEAR ATTN ASSY	* * * *	
1	201-0100	RES FXD COMP 10 OHM	01121	RC20GF100J (MIL-R-11/3)
2	201-0270	RES FXD COMP 27.0 OHM	81349	RC20GF270J (MIL-R-11/3)
3	201-0620	RES FXD COMP 62.0 OHM	81349	RC20GF620J (MIL-R-11/3)
4	205-1000	RES FXD FILM 100. OHM	81349	RN65D1000F (MIL-R-10509/2)
5	204-0101	RES FXD COMP 100. OHM	81349	RC07GF101J (MIL-R-11/8)
6	214-0470	RES FXD WW 47 OHM	81349	RW59V470
7	4238-0032	SCR PAN HD 2-56X1/2	96906	MS51957-7
8	610-0201	TERMINAL,SOLDER	71279	1558-4
9	3869-0181	WASHER LOCK INT NO 2	96906	MS35333-69
10	3872-0039	NUT HEX 2-56X3/16 AF	96906	MS35649-224
11	3426-0021	TUBING TEFLON NO 20	70331	TFT-200/20NAT
12	3679-0034	WIRE RESISTANCE	19397	MOLECULOY NO 34 LIGHT ENAMEL
13	3753-0003	EYELET	72653	7253 C
15	3877-0004	TERMINAL SOLDER	88245	1300 D
16	3886-0016	TAPE PRESS SENS 1/4	76381	465
18	6822	BOARD	19397	6822
19	6823	BOARD	19397	6823
20	8819-0018	WIRE BUS BAR 18 AWG	70903	8019
21	8819-0022	WIRE BUS BAR 22 AWG	70903	8021

REFERENCE DESIGNATION	T R A C O R STOCK NUMBER	DESCRIPTION	TYPICAL MFGR	MANUFACTURER PART NUMBER
22	751013	SPACER	19397	751013
23	751178	BAR COMMON SILVER	19397	751178
27	4468-0005	ADHESIVE INSULATING	07707	USM CLEAR ROD TYPE HOT MELT
28	17437-0001	TERMINAL FEED-THRU	19397	17437-0001
29	23285-0002	SCR FIL HD 0-80X1/8	73734	CRES 0-80X1/8
30	751181	BAR SILVER CONTACT	19397	751181
* * * *	* ASSEMBLY NO 754057-	ASSY GEAR RIBBON	* * * *	
1	754058	GEAR MODIFICATION	19397	754058
2	754059	BUSHING GEAR RIBBON	19397	754059
3	3565-0107	ROLLPIN .094X.500	96906	MS171496
* * * *	* ASSEMBLY NO 754060-	GEAR MOTOR IDLER ASSY	* * * *	
1	754061	GEAR MODIFICATION	19397	754061
2	3846-1004	GEAR NYLON SPUR	93990	MG-3218-N
3	3863-0002	SEALANT LOCKTITE	05972	RR TYPE A (MIL-S-22473)
* * * *	* ASSEMBLY NO 754109-0003	ARJ4A ASSEMBLY	* * * *	
	9038	EARPHONE SET ASSY	19397	9038
2	175-0024	SCREW BND 4-40X .375	73734	4024
3	175-0100	SCREW BND 4-40X1.	73734	4029
4	177-0024	SCREW BND 6-32X .375	73734	4034
5	177-0032	SCREW BND 6-32X .500	73734	4036
6	178-0024	SCREW BND 8-32X .375	73734	4054
7	178-0048	SCREW BND 8-32X .750	73734	4058
8	180-0032	SCREW BND 10-32X .500	73734	4076
11	220-0032	SCREW FLT 6-32X .500	73734	2145
12	399-0016	SCREW BUT 4-40X .250	73734	HT TR STL, NI PL
13	620-0123	WASHER LOCK INT NO 4	73734	1302
14	620-0125	WASHER LOCK INT NO 6	73734	1304
15	620-0126	WASHER LOCK INT NO 8	73734	1305
16	620-0127	WASHER LOCK INT NO 10	73734	1306
17	639-0012	WASHER NYLON NO 8	73734	5610-18-032
18	647-0010	NUT SERRATED 15/32-32	73734	76330-NP
19	649-0074	NUT HEX 4-40X1/4 AF	73734	8003 STL CAD PL
21	3326-0042	RIVET POP 1/8X.232	07707	AD428S
31	3663-0412	HANDLE	19397	3663-0412
32	3666-0005	BUMPER RUBBER	83330	2135
38	4241-0032	SCR PAN HD 8-32X1/2	73734	MS51957-45
39	3801-0004	CABLE 23AWG 21/36STRD	70903	8495
43	3905-0001	MOUNT RESILIENT	26624	7172057
48	3915-0005	INSERT THREADED	94222	72-1-832-13
49	3916-0003	LATCH MAGNET	19397	3916-0003
50	3807-0050	RUBBER STRIP SPONGE	77969	1/2THK 2LB/CU FT ADH BACKED
53	6152	PLATE IDENT	19397	6152
55	6766	SUPPORT RACK MTG	19397	6766
58	6770	HOLDER RACK	19397	6770
59	6771	PANEL DECORATIVE	19397	6771
60	6772-0003	PANEL CONTROL	19397	6772-0003
61	6775	PANEL REAR	19397	6775
62	6779	PLATE BASE	19397	6779
63	6852	RACK	19397	6852
64	6881	COVER DECORATIVE	19397	6881
66	6891	BRACKET	19397	6891
67	6892	BRACKET SWITCH	19397	6892
77	754108	CASE	19397	754108
80	651-0017	NUT HEX 6-32X1/4 AF	73734	8005 STL CAD PL
81	8556	BRACKET	19397	8556
82	649-0133	NUT HEX 8-32X11/32 AF	73734	70210
84	9344	LABEL	19397	9344
85	3979-0001	TERMINAL LUG 22-18	96906	MS25036-101 (MIL-T-7928)
88	5056-0040	STANDOFF H 4-40X5/8	83330	8404
89	617-0256	WASHER FLAT NO 4	73734	1402 STL CAD PL
90	3326-0043	RIVET POP 1/8X294	07707	AD438S
91	617-0267	WASHER FLAT NO 6	73734	1404 STL CAD PL
92	177-0020	SCREW BND 6-32X .312	73734	4033
93	3455-0772	CLAMP CABLE 3/16	83330	772
94	175-0012	SCREW BND 4-40X .187	73734	4021
96	667-0024	SCR SHT METAL NO 6	73734	7111
97	3326-0032	RIVET POP 3/32X.212	07707	AD328S
98	180-0024	SCREW BND 10-32X .375	73734	4074
99	617-0277	WASHER FLAT NO 10	73734	1411 STL CAD PL
102	618-0130	WASHER LOCK SPLIT	73734	MS35338-40
103	620-0131	WASHER LOCK INT 3/8	73734	1310
104	3331-0042	NUT CLINCH 8-32	46384	CL-832-1 STL CAD PL
105	3331-0037	NUT CLINCH 6-32	46384	CL-632-2 STL CAD PL
106	17387-0001	VIBRATION ISOLATORS	19397	17387-0001
107	19670-0011	PAD, SHIPPING	19397	19670-0011
A 1	6848	ASSY FINAL UPPER UNIT	19397	6848

LIST OF REPLACEABLE PARTS DATE 08/05/76

REFERENCE DESIGNATION	TRACOR STOCK NUMBER	DESCRIPTION	TYPICAL MFGR	MANUFACTURER PART NUMBER
A 2	6894	OSCILLATOR ASSY	19397	6894
A 3	6899	WIRING HARNESS ARJ4A	19397	6899
A 4	6897	COVER ASSY	19397	6897
A 5	6895-0003	ACCESSORY PKG ASSY	19397	6895-0003
A 7	9607	ASSY CONTACT ARM	19397	9607
A 8	6825	PLATE TABLE UNIT ASSY	19397	6825
E 1	3756-0002	KNOB RED	82389	M-1178-1
E 2	3756-0002	KNOB RED	82389	M-1178-1
E 3	3756-0010	KNOB BLK	82389	M-1178-2
E 4	3756-0010	KNOB BLK	82389	M-1178-2
F 1	3487-9101	FUSE 1 A 250 VOLT	75915	F02B 250V 1A
F 2	3487-9502	FUSE 1/2 A 250 VOLT	75915	F02B 250V 1/2A
J 1	3648-0006	CONN SOC ELECT	71785	S-304AB
J 2	3648-0004	CONN SOC ELEC	71785	S-303AB
J 3	3459-0005	CONNECTOR PLUG	96791	160-5
J 4	3448-0011	JACK EARPHONE	82389	12B
K 1	3903-0811	RELAY, DPDT	77342	KA11AY 115V
K 2	3903-0811	RELAY, DPDT	77342	KA11AY 115V
K 3	3904-0003	RELAY TIME DELAY	74193	AN1-522-XAX 15 SEC DELAY
R 1	201-0510	RES FXD COMP 51.0 OHM	81349	RC20GF510J (MIL-R-11/3)
R 2	201-0510	RES FXD COMP 51.0 OHM	81349	RC20GF510J (MIL-R-11/3)
R 3	201-0680	RES FXD COMP 68.0 OHM	81349	RC20GF680J (MIL-R-11/3)
S 3	3755-0008	SWITCH TELE 3 POS	82389	16036
S 4	3755-0008	SWITCH TELE 3 POS	82389	16036
S 5	3755-0008	SWITCH TELE 3 POS	82389	16036
S 6	3755-0011	SWITCH TELE 3 POS	82389	160312
S 7	6741	BOARD PRINTED CIRCUIT	19397	6741
S 8	3633-0001	SWITCH SLIDE	82389	46256LF
S 9	3882-0003	SWITCH LEVER	91929	W7-2RL
DS 1	87-0521	LAMP BULB NEON 110V	08806	B2A (NE51-H)
DS 2	87-0521	LAMP BULB NEON 110V	08806	B2A (NE51-H)
MP 1	3908-0001	RIBBON TYPEWRITER	T0014	D284A 1/2 INCH
MP 2	3907-0001	SPOOL RIBBON	T0014	D286A 1/2X2
XF 1	3488-0001	FUSEHOLDER 1/4X1 1/4	71400	HKP
XF 2	3488-0001	FUSEHOLDER 1/4X1 1/4	71400	HKP
XDS 1	3906-2413	HOLDER LAMP	72765	5200-232-604 WHITE
XDS 2	3906-1413	HOLDER LAMP	72765	5200-232-604 RED

4.4 PARTS AVAILABLE IN FEDERAL SUPPLY SYSTEM

The parts listed herein are also available in the Federal Supply System.

The TRACOR part number and description are followed by the stock number of the appropriate or approving agency in the Federal Supply System.

REPAIR PARTS AVAILABLE IN FEDERAL SUPPLY SYSTEM

MFR P/N	NAME	FSN	*SOURCE
3467-0016	Cable Assembly	5995-842-0721	DGSC
3487-9101	Fuse 1 amp	5920-850-6091	DESC
3487-9502	Fuse ½ amp	5920-199-9498	DESC
3755-0011	Switch	5930-816-4163	DESC
3814-2142	Belt	3030-891-5310	DPSC
3814-2234	Belt	3030-891-5309	DPSC
3882-0003	Switch	5930-850-0538	DESC
3908-0001	Ribbon	6515-469-5288	DPSC
6853	Guide	6515-730-8426	DPSC
700-0262	Tube 6SJ7	5960-100-5268	DESC
700-0287	Tube 6AU5GT	5960-262-0151	DESC
18302-0001	Switch Assy.	6515-466-2405	DPSC
754033	Chart ISO	6515-113-8332	DPSC
754060	Gear Cluster	3020-494-7286	DPSC
754083	Washer	5310-817-1228	DPSC
800-3255	Diode	5961-068-6953	DESC
87-054	Lamp	6240-682-3411	DGSC
87-1203	Lamp	6240-143-7510	DGSC

* Source
DESC - Defense Electronic Supply Center
DGSC - Defense General Supply Center
DPSC - Defense Personnel Support Center(Medical)

REPAIR PARTS AVAILABLE IN THE FEDERAL SUPPLY SYSTEM

TRACOR P/N	DESCRIPTION	NSN
201-0100	RES FXD COMP 10 OHMS	5905-00-190-8883
201-0270	RES FXD COMP 27 OHMS	5905-00-279-1879
201-0272	RES FXD COMP 2.7K OHMS	5905-00-141-1130
201-0274	RES FXD COMP 270K OHMS	5905-00-114-5416
201-0474	RES FXD COMP 470K OHMS	5905-00-141-1071
201-0510	RES FXD COMP 51 OHMS	5905-00-114-5438
201-0563	RES FXD COMP 56K OHMS	5905-00-171-1986
201-0620	RES FXD COMP 62 OHMS	5905-00-141-0722
201-0680	RES FXD COMP 68 OHMS	5905-00-116-8566
208-0181	RES FXD COMP 180 OHMS	5905-00-935-8544
205-1000	RES FXD FILM 100 OHMS	5905-00-158-5065
210-0222	RES FXD COMP 2.2K OHMS	5905-00-279-2529
212-1432	RES FXD FILM 14.3K OHMS	5905-00-723-9048
212-2053	RES FXD FILM 205K OHMS	5905-00-199-6566
212-2802	RES FXD FILM 28K OHMS	5905-00-067-8581
212-9092	RES FXD FILM 90.9K OHMS	5905-00-192-3488
214-0470	RESISTOR 47 OHMS	5905-00-994-7134
3318-5010	CONN RECP ELEC 15 PIN	5935-00-553-2789
3353-9102	CAP FXD MY/PA .1 MFD	5910-00-913-1097
3353-9203	CAP FXD MY/PA .02 MFD	5910-00-932-0473
3353-9503	CAP FXD MY/PA .05 MFD	5910-00-463-9507
3418-0202	RES FXD WW 2K OHMS	5905-00-983-9663
3418-0252	RES FXD WW 2.5K OHMS	5905-00-994-7228
3448-0011	JACK PHONE	5935-00-539-1192
3459-0005	CONN RECP AC POWER	5935-00-845-5143
3467-0016	CABLE POWER	6150-00-842-0721
3487-9101	FUSE 1 AMP	5920-00-850-6091
3487-9502	FUSE 1/2 AMP	5920-00-199-9498
3522-0252	RES VAR COMP 2.5K OHMS	5905-00-539-2567
3596-0202	RES VAR WW 2K OHMS	5905-00-068-6962

TRACOR P/N	DESCRIPTION	NSN
3613-0001	TERMINAL STRIP 1 PIN	5940-00-271-4622
3613-0002	TERMINAL STRIP 2 PIN	5940-00-686-7687
3613-0011	TERMINAL STRIP 2 PIN	5940-00-329-5409
3648-0004	CONN SOC ELEC	5935-00-590-2182
3648-0006	CONN SOC ELEC	5935-00-500-6147
3755-0008	SWITCH TELE 3 POS	5930-00-053-8063
3755-0011	SWITCH TELE 3 POS	5930-00-816-4163
3756-0002	KNOB RED	5355-00-156-2976
3756-0010	KNOB BLK	5355-00-113-3883
3773-0010	CONN SOC ELEC	5935-00-785-8226
3814-2142	BELT	3030-00-891-5310
3814-2234	BELT	3030-00-891-5309
3876-0003	TERMINAL SOLDER	5940-00-433-5770
3882-0003	SWITCH	5930-00-850-0538
3901-0001	SOCKET LAMP	5965-00-263-0903
3903-0811	HEADBAND	5945-00-829-2008
3904-0001	RELAY TIME DELAY	5945-00-063-7272
3908-0001	RIBBON	6515-00-469-5288
700-0262	TUBE 6SJ7	5960-00-100-5268
700-0287	TUBE 6AU5GT	5960-00-262-0151
754060	GEAR CLUSTER	3020-00-494-7286
754033	CHART ISO	6515-00-113-8332
754083	WASHER	5310-00-817-1228
800-3255	DIODE	5961-00-068-6953
87-0521	LAMP	6240-00-682-3411
87-1203	LAMP	6240-00-143-7510
3908-0001	CAP EARPHONE RED	6515-00-469-5288
3908-0002	CAP EARPHONE BLUE	6515-00-817-2587
3842-0031	SPRING EXTENSION INST	5360-00-817-1261
3839-0002	MOTOR	6515-00-307-1284
3910-0001	CORD PHONE	6515-00-288-1911
6853	GUIDE	6515-00-730-8426
18302-0001	SWITCH ASSY	6515-00-466-2405

4.5 CODE LIST OF MANUFACTURERS

4.5.1 Contents of List

The Code List of Manufacturers contains the following information about manufacturers of individual parts used in the instrument:

(1) the manufacturer's Federal-Supply-Code-for-Manufacturers code number,

(2) the manufacturer's name, and

(3) the manufacturer's address.

The manufacturers are listed in numerical order by their Federal-Supply-Code-for-Manufacturers code numbers.

4.5.2 Use of List

To find the manufacturer of any given part in the instrument, determine the manufacturer's code number by reference to the List of Replaceable Parts, see Section 4.4, and then locate that number in the corresponding column in the Code List of Manufacturers. Pertinent information about the manufacturer is found in the row in which his code number appears.

MANUAL LISTING OF FEDERAL SUPPLY CODES FOR MANUFACTURERS

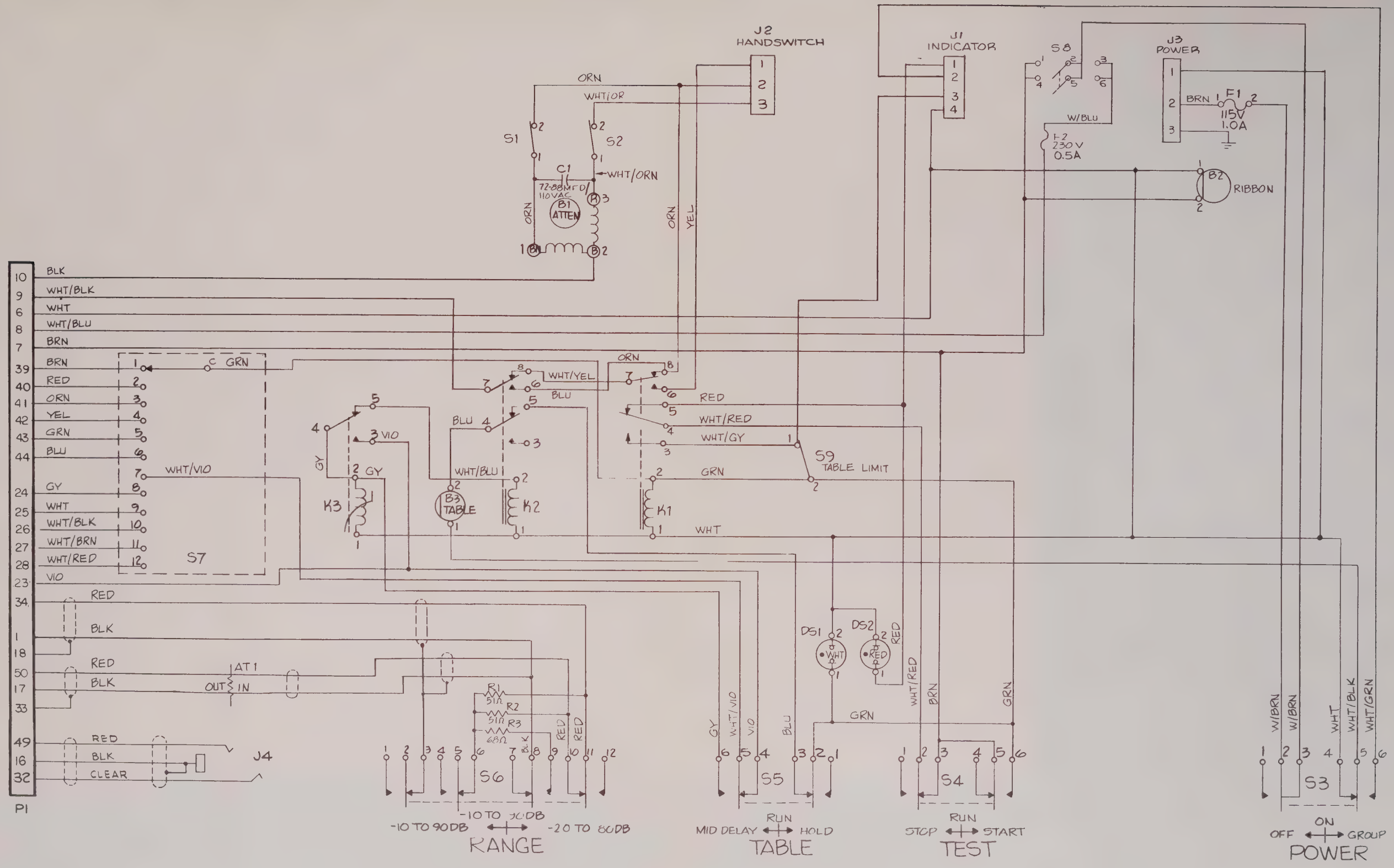
CODE	MANUFACTURER	
T0014	PEERLESS IMPERIAL CO	NEWARK N J
T0025	RING CHEMICAL CO	HOUSTON TEXAS
01121	ALLEN-BRADLEY CO	MILWAUKEE WIS
02660	AMPHENOL CORP	BROADVIEW ILL
02735	RADIO CORP OF AMERICA SOLID STATE AND REC TUBE DIV	SOMERVILLE N J
02770	BRISTOL MOTORS DIV OF VOCALINE CO OF AMERICA	OLD SAYBROOK CONN
03038	LONG-LOK CORP	LOS ANGELES CALIF
04552	EMERSON AND CUMING INC	CANTON MASS
04713	MOTOROLA SEMICONDUCTOR PRODUCTS INC	PHOENIX ARIZ
05972	LOCTITE CORP	NEWINGTON CONN
06540	AMATOM ELECTRONIC HARDWARE CO INC	NEW ROCHELLE N Y
07707	UNITED SHOE MACHINERY CORP FASTENER DIVISION	SHELTON CONN
08806	GENERAL ELECTRIC CO MINIATURE LAMP DEPT	CLEVELAND OHIO
14907	CONRAC CORP CRAMER DIV	OLD SAYBROOK CONN
15053	KAYLOCK DIVISION,KAYNAR MFG. CO.	FULLERTON CALIF
16238	LORD MFG CO INC.	SOUTH LANCASTER MASS
17870	DAVEN DIV THOMAS A EDISON INDUSTRIES MCGRAW-EDISON CO	MANCHESTER N H
19397	TRACOR INC	AUSTIN TEX
23050	PRODUCT COMPONENTS CORPORATION	HASTINGS-ON-HUDSON N Y
24024	ROBINTECH INC ELECTRO MECHANICAL DIVISION	BURBANK CALIF
27191	CUTLER-HAMMER INC PWR DISTRIBUTION AND CONTROL DIV	MILWAUKEE WIS
32105	THOMSON INDUSTRIES INC	WASHINGTON, NY
37942	MALLORY P R AND CO INC	INDIANAPOLIS IND
44655	OHMITE MFG CO	SKOKIE ILL
46384	PENN ENGINEERING AND MFG CORP	DOYLESTOWN PA
50289	SPRAGUE ELECTRIC CO	NORTH ADAMS MASS
70331	ALPHA WIRE CORP - CANCELED - SEE 92194	
70903	BELDEN MFG CO	CHICAGO ILL
71041	BOSTON GEAR WORKS DIVISION OF MURRAY CO OF TEXAS	ST QUINCY MASS
71279	CAMBRIDGE THERMIONIC CORP	CAMBRIDGE MASS
71400	BUSSMAN MFG DIVISION OF MCGRAW-EDISON CO	ST LOUIS MO
71785	CINCH MFG CO AND HOWARD B JONES DIV	CHICAGO ILL
72653	G C ELECTRONICS MFG CO	ROCKFORD ILL
72765	DRAKE MFG CO	HARWOOD HEIGHTS ILL
72913	GRIGOLEIT CO THE	DECATUR ILL
73734	FEDERAL SCREW PRODUCTS CORP	CHICAGO ILL
73774	GENERAL ELECTRIC SUPPLY - CANCELED - SEE 24453	
74193	HEINEMANN ELECTRIC CO	TRENTON N J
75915	LITTELFUSE INC	DES PLAINES ILL
76101	MAICO ELECTRONICS	MINNEAPOLIS MINN
76381	MINNESOTA MINING AND MFG CO	ST PAUL MINN
77308	PLASTIC AND RUBBER PRODUCTS	LOS ANGELES CALIF
77342	POTTER AND BRUMFIELD - SEE AMERICAN MACHINE AND FOUNDRY	
77969	RUBBERCRAFT CORP	TORRANCE CALIF
78711	TELEPHONICS DIV OF INSTRUMENT SYSTEMS CORP	HUNTINGTON N Y
79061	VACO PRODUCTS INC	CHICAGO ILL
80183	SPRAGUE PRODUCTS CO	NORTH ADAMS MASS
80294	BOURNS LABORATORIES INC	RIVERSIDE CALIF
80583	HAMMARLUND CO INC	MARS HILL N C
81349	MILITARY SPECIFICATIONS	STD DIV DIR OF LOG SER DSA
82389	SWITCHCRAFT INC	CHICAGO ILL
83330	SMITH HERMAN H INC	BROOKLYN N Y
84171	ARCO ELECTRONICS INC	GREAT NECK N Y
84830	LEE SPRING CO. INC.	BROOKLYN N Y
85599	GENERAL ELECTRIC CO TUBE DEPT	SCHENECTADY N Y
86603	PROTECTION PRODUCTS MFG CO (WELDWOOD CEMENT)	KALAMAZOO MICH
86928	SEASTROM MFG CO INC	GLENDALE CALIF
88245	U S ENGINEERING CO - SEE LITTON INDUSTRIES USECO DIV	
90012	SPERRY RAND ELECTRO COMP PLNT OF SPERRY RAND CORP	DURHAM, NC
90052	BOSTON GEAR WORKS DIV OF MURRAY CO OF TEXAS	PHILADELPHIA PA
91929	HONEYWELL INC MICROSWITCH DIV	FREEPORT ILL
93990	CLIMAX METAL PRODUCTS	CLEVELAND OHIO
94222	SOUTH CHESTER CORP	CHESTER PA
96791	AMPHENOL CORP AMPHENOL CONTROLS DIVISION	JANESVILLE WIS
96906	MILITARY STANDARD (MS) DRAWINGS	STD DIV DIR OF LOG SER DSA
97918		
98124	HUNT-WILDE CORP	DAYTON OHIO

DRAWINGS AND SCHEMATICS

SECTION V

5. LIST OF ASSEMBLIES AND SCHEMATICS

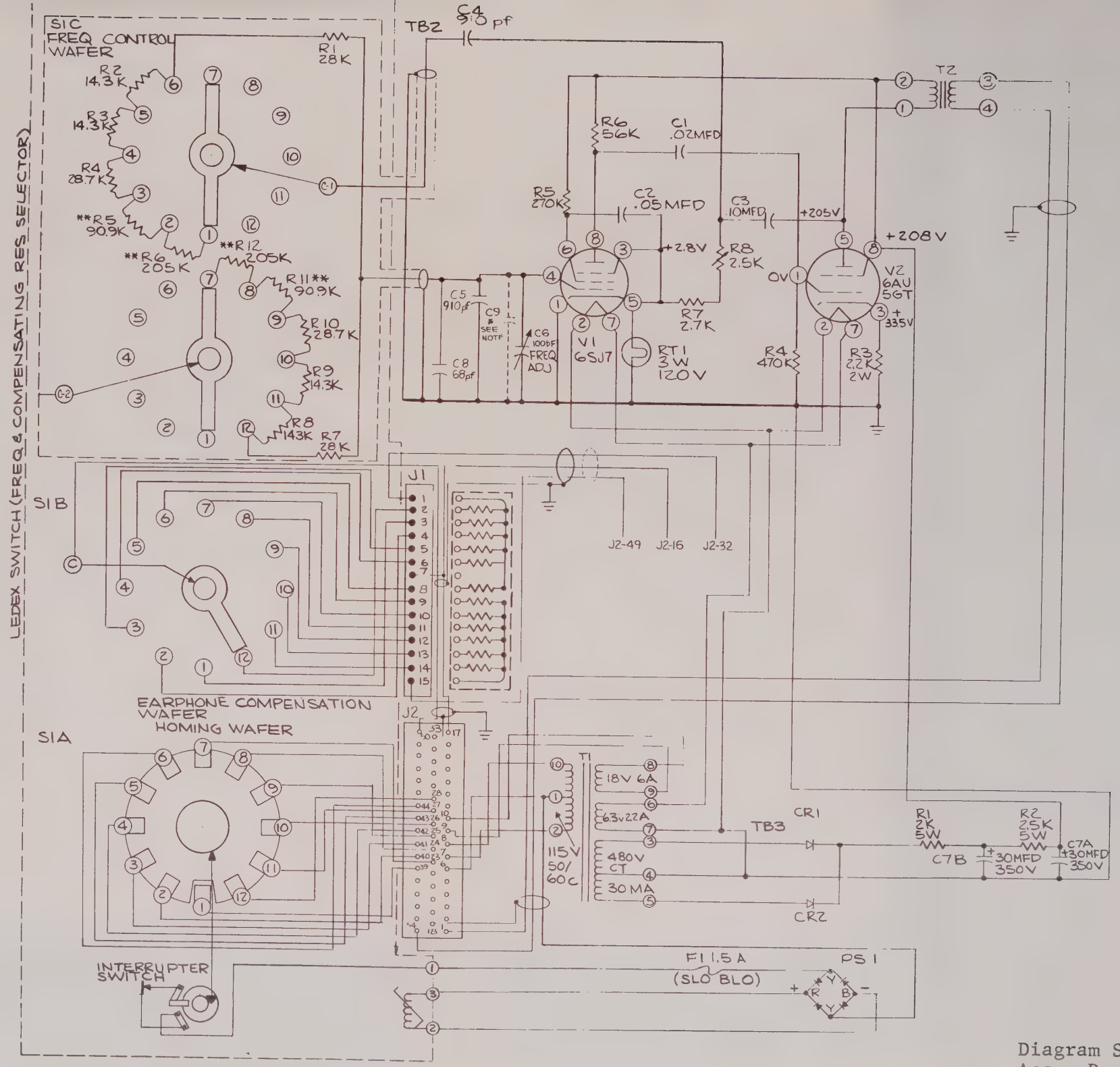
Title	Drawing No.	Page
Diagram, Schematic - Recording Assy, ARJ-4A Audiometer	6903 D	5-3/4
Diagram, Schematic, Oscillator Assy	7465 F	5-5/6
Plate Assembly, Ribbon Mounting	6815 G	5-7/8
Plate Table Unit Assy	6825 J	5-9/10
Final Upper Unit Assy	6848 K	5-11/12
Oscillator Assy	6894 L	5-13/14
ARJ-4A Final Assy	754109 R sheet 1	5-15/16
	754109 R sheet 2	5-17/18



2. SWITCH 3,4,5 & 6 SHOWN IN CENTER POSITION, S8 SHOWN IN 115 V POSITION
1. UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN MFD

NOTES:

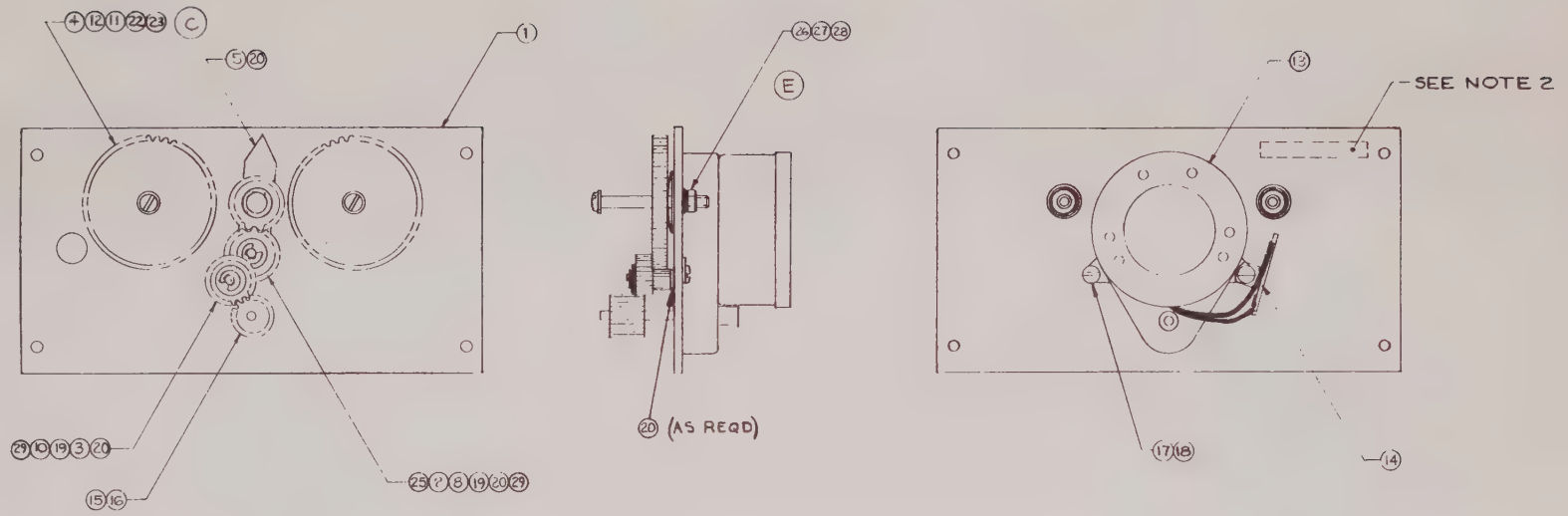
Diagram Schematic, Recording Assy, ARJ-4A Audiometer
Dwg. No. 6903 D



* NOTE. ON UNITS OF SERIAL NO 1793 AND ABOVE C9 MAY EXIST AS A FACTORY GRADED COMPONENT. REF TRACOR P/N 27512-XXXX

** NOTE. R5, R6, R11 AND R12 MAY BE FACTORY SELECTED TO PLACE FREQUENCY OF 500 Hz AND 1000 Hz IN TOLERANCE UNDER SPAN OF CONTROL OF C6

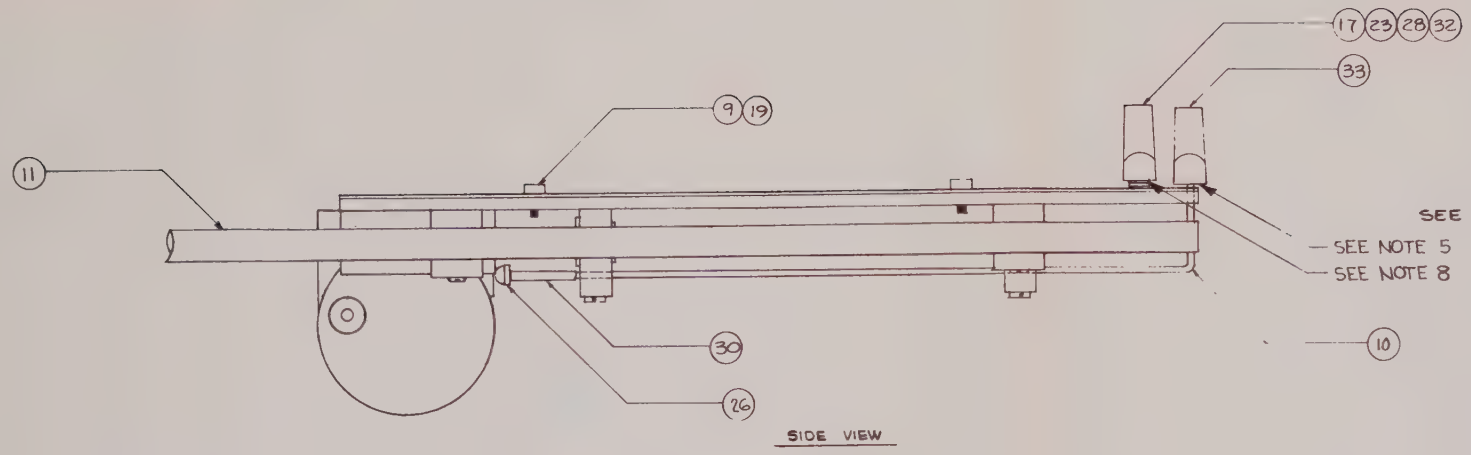
Diagram Schematic, Oscillator Assy, Dwg. No. 7465 F



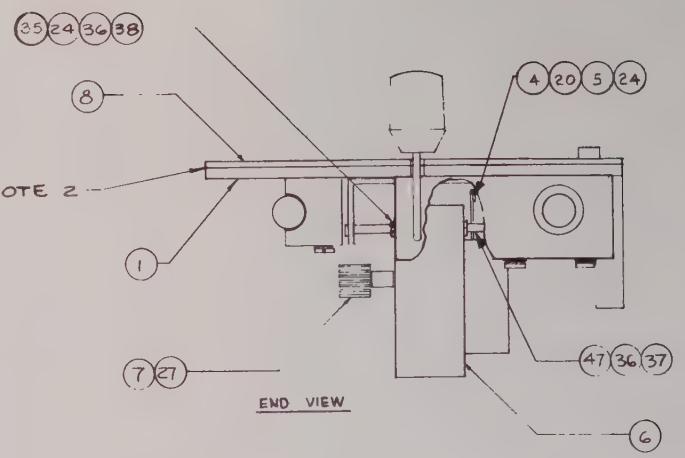
2. IDENTIFY PART AS TRACOR STOCK NO. 6815 AND REVISION LETTER OF ASSOCIATED PL.
1. SEE SEPERATE PARTS LIST FOR COMPLETE LIST OF MATERIALS.

NOTES:

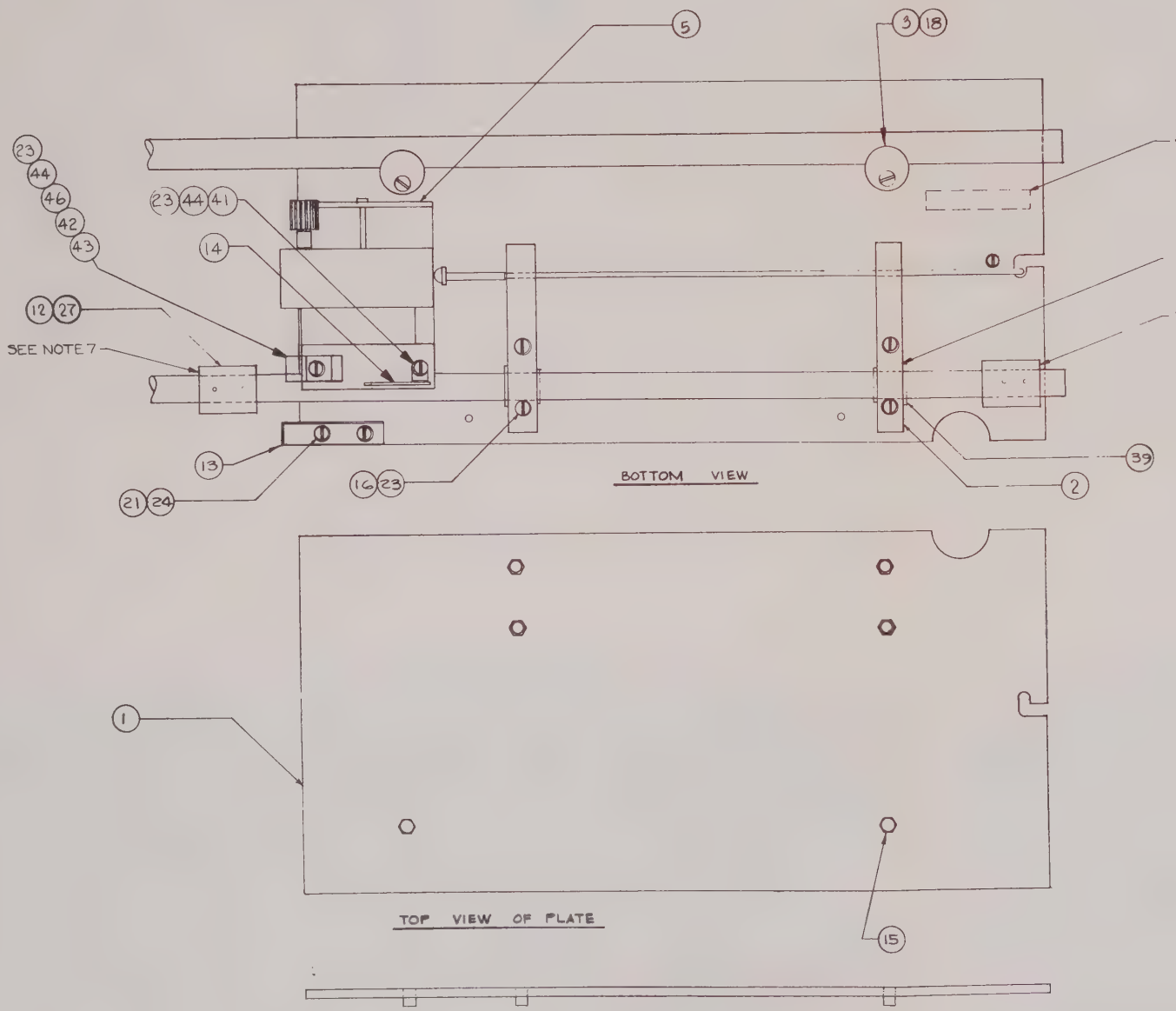
Plate Assy, Ribbon Mounting
Dwg. No. 6815 G



SIDE VIEW



END VIEW



BOTTOM VIEW

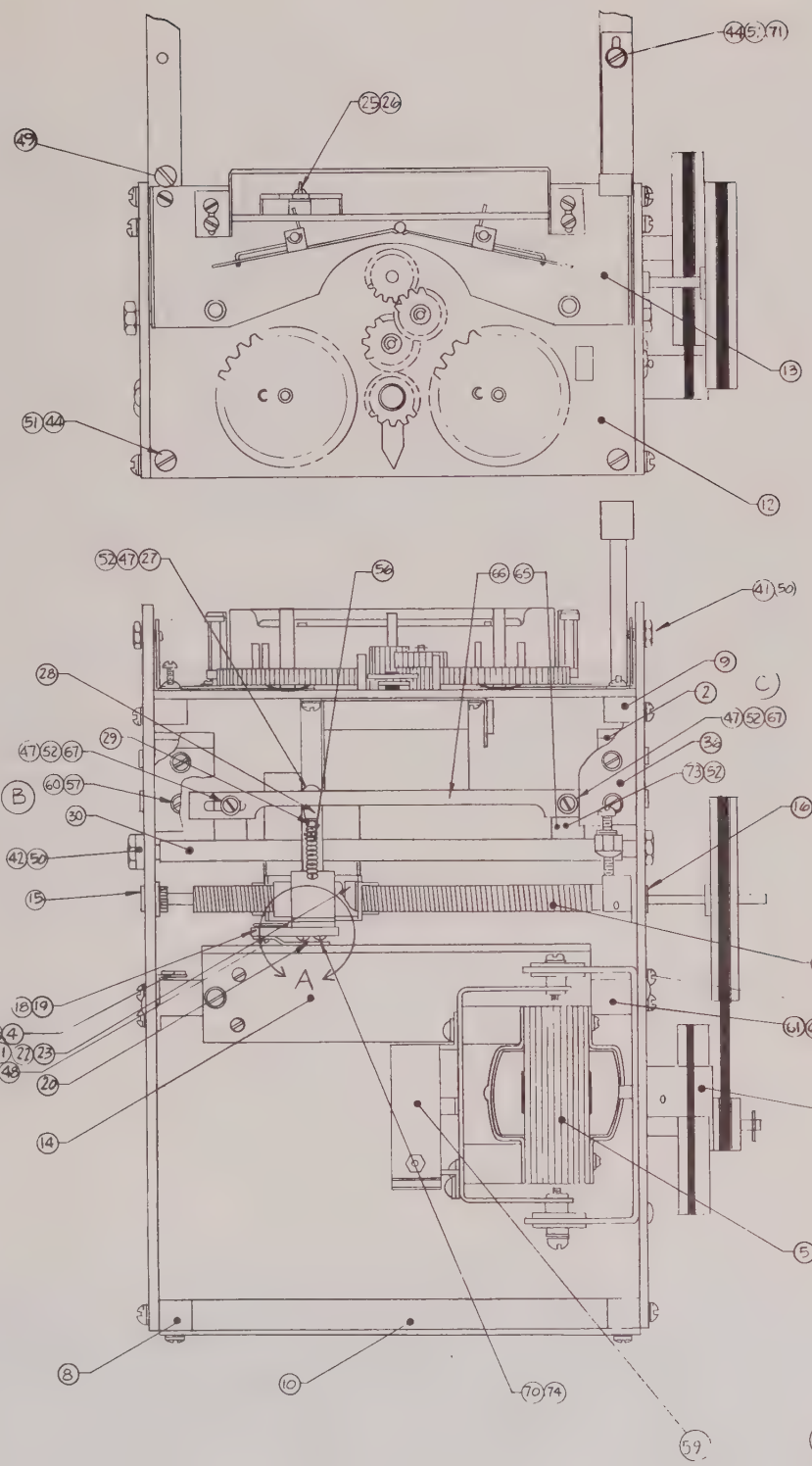
TOP VIEW OF PLATE

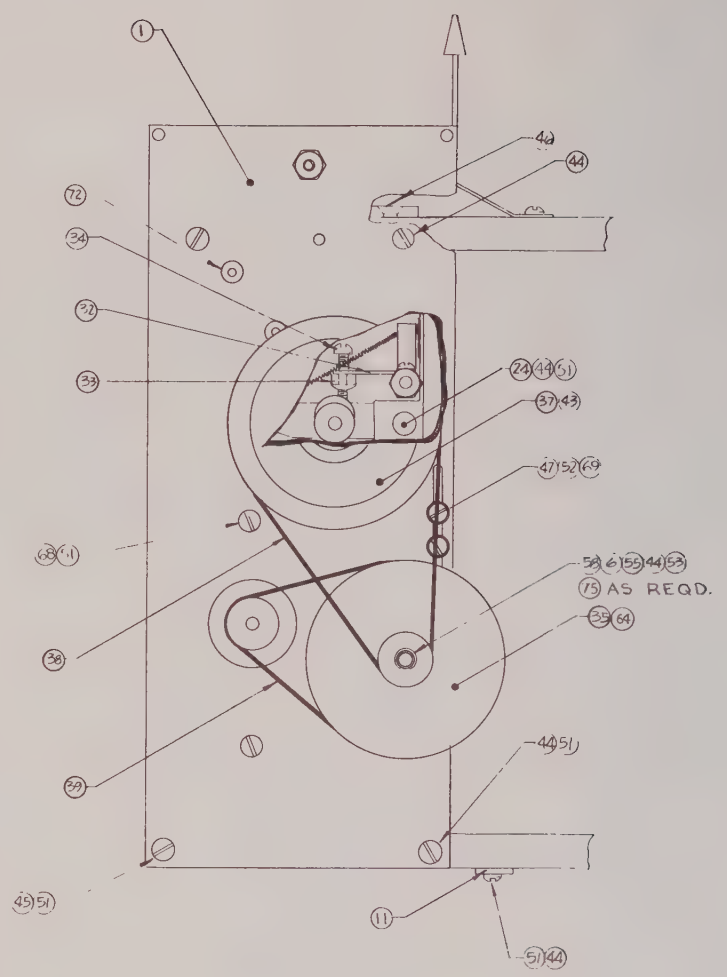
NOTES:

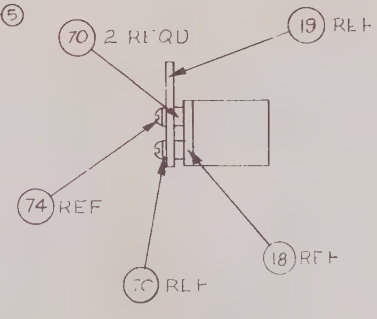
1. IDENTIFY ASSEMBLY AS TRACOR STK. NO. 6825 AND REVISION LETTER OF ASSOCIATED L.D. IN LOCATION SHOWN.
2. ADHERE (1) AND (8) WITH (40)
3. ADHERE (2) AND (39) WITH (45)
4. SEE SEPARATE PARTS LIST FOR COMPLETE LIST OF MATERIALS.
5. ADHERE (33) AND (10) WITH (45)
6. PLACE ITEM 12 APPROX 1/4 INCH FROM END OF ITEM 11. SET SCREWS SHOULD BE SNUGGED UP, BUT NOT OVER TIGHTENED SINCE THE EXACT LOCATION WILL BE ADJUSTED LATER.
7. PLACE ITEM 12 APPROX 2 3/8 INCHES FROM END OF ITEM 11. SET SCREWS SHOULD BE SNUGGED UP, BUT NOT OVER TIGHTENED.
8. ADHERE (32) AND (17) WITH (45)

Plate Table Unit Assy,
Dwg. No. 6825 J

5-9/10





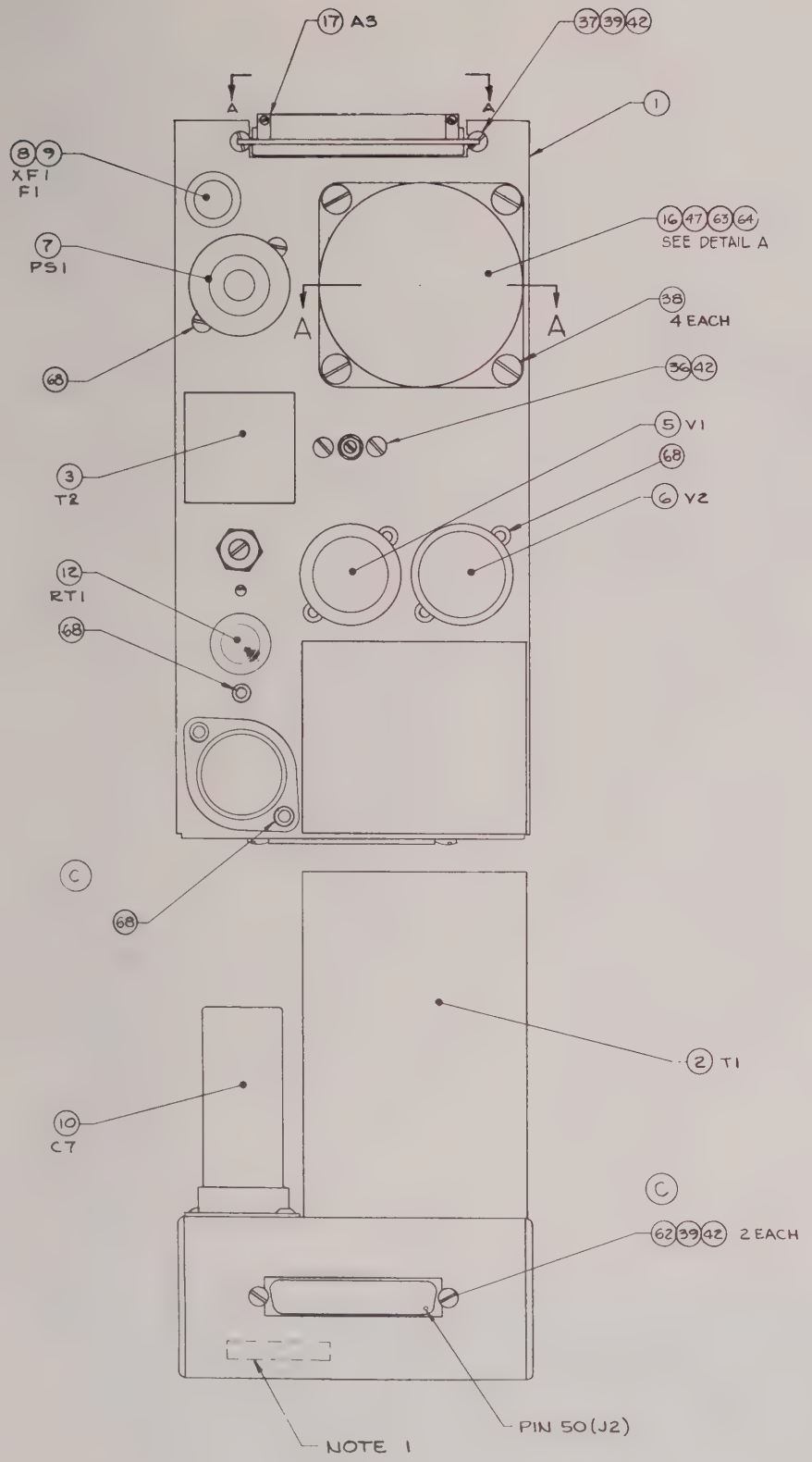


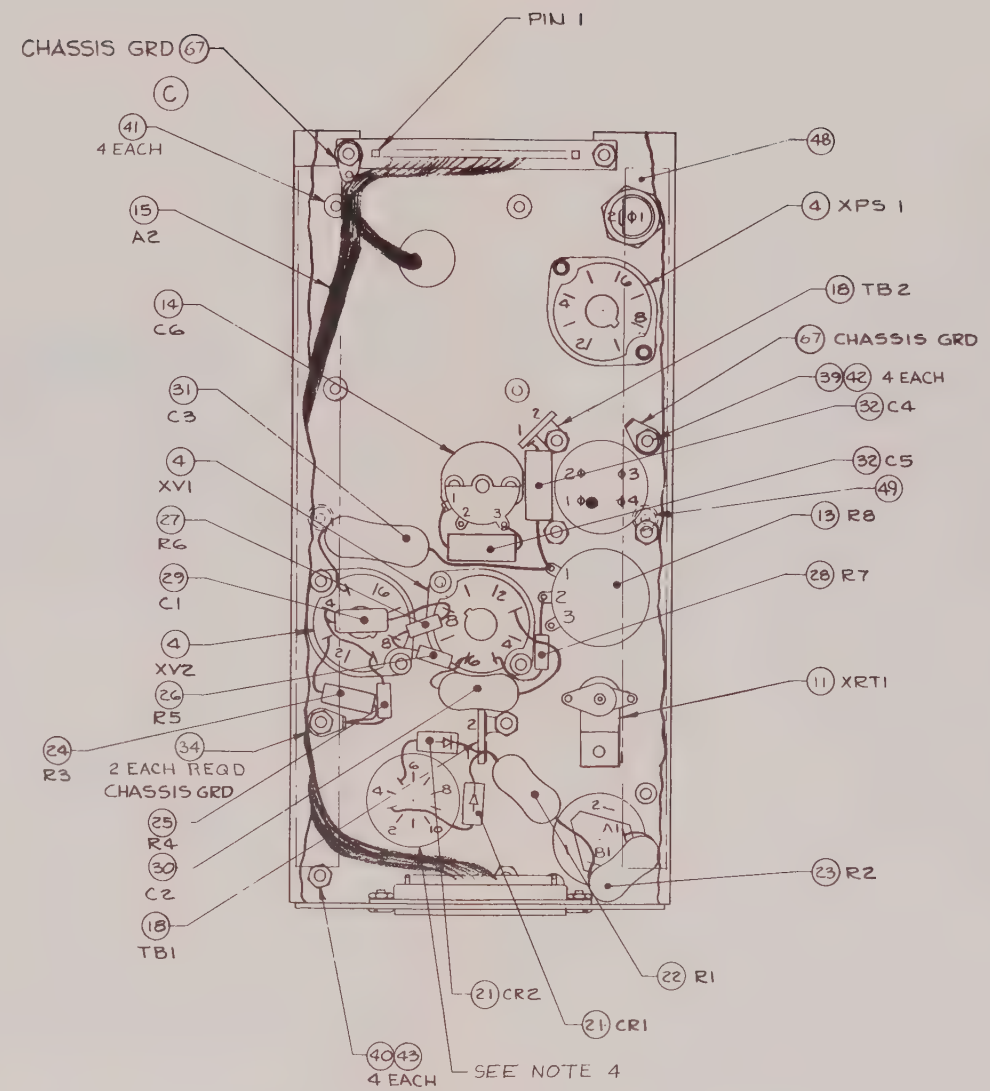
DETAIL A

NOTES:
1. FOR DETAIL LIST OF MATERIALS SEE PL 6848
2. IDENTIFY PART AS TRACOR STK NO 6848 & REVISION LETTER OF ASSOCIATED PL

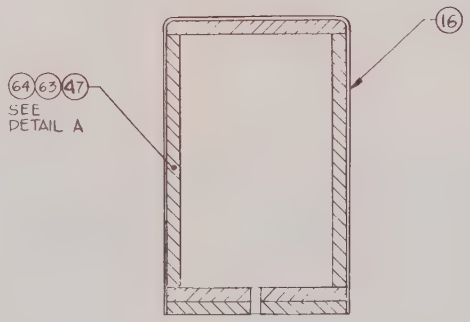
Final Upper Unit Assy
Dwg. No. 6848 K

5-11/12

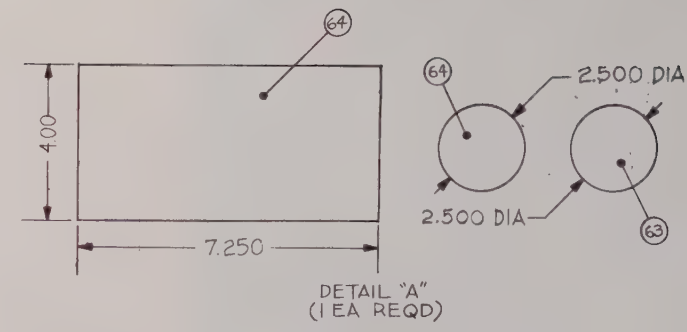




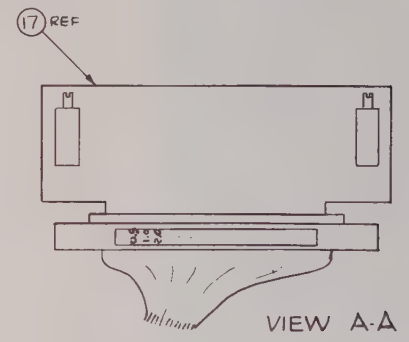
BOTTOM VIEW



SECTION A A
NO SCALE
SEE NOTE 3



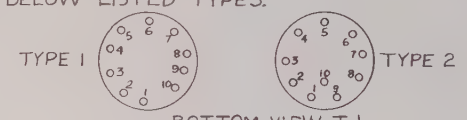
DETAIL "A"
(1 EA REQD)



VIEW A-A

NOTES:

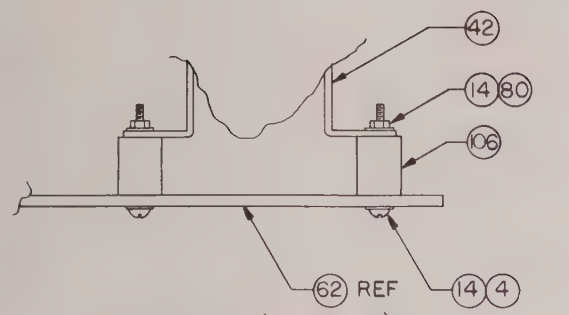
1. IDENTIFY ASSEMBLY AS TRACOR STK NO 6894 AND REVISION LETTER OF ASSOCIATED PL IN LOCATION SHOWN.
2. SEE SEPARATE PART LIST FOR COMPLETE LIST OF MATERIALS
3. ADHERE ITEM 46 TO ITEM 18 USING ITEM 47, AS SHOWN IN SECTION A-A.
4. TRANSFORMER, ITEM 2, BASES MAY BE ONE OF THE BELOW LISTED TYPES.



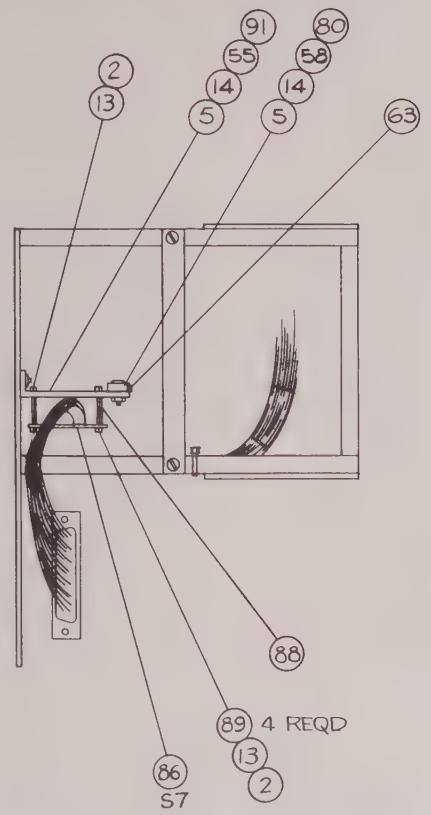
BOTTOM VIEW T-1

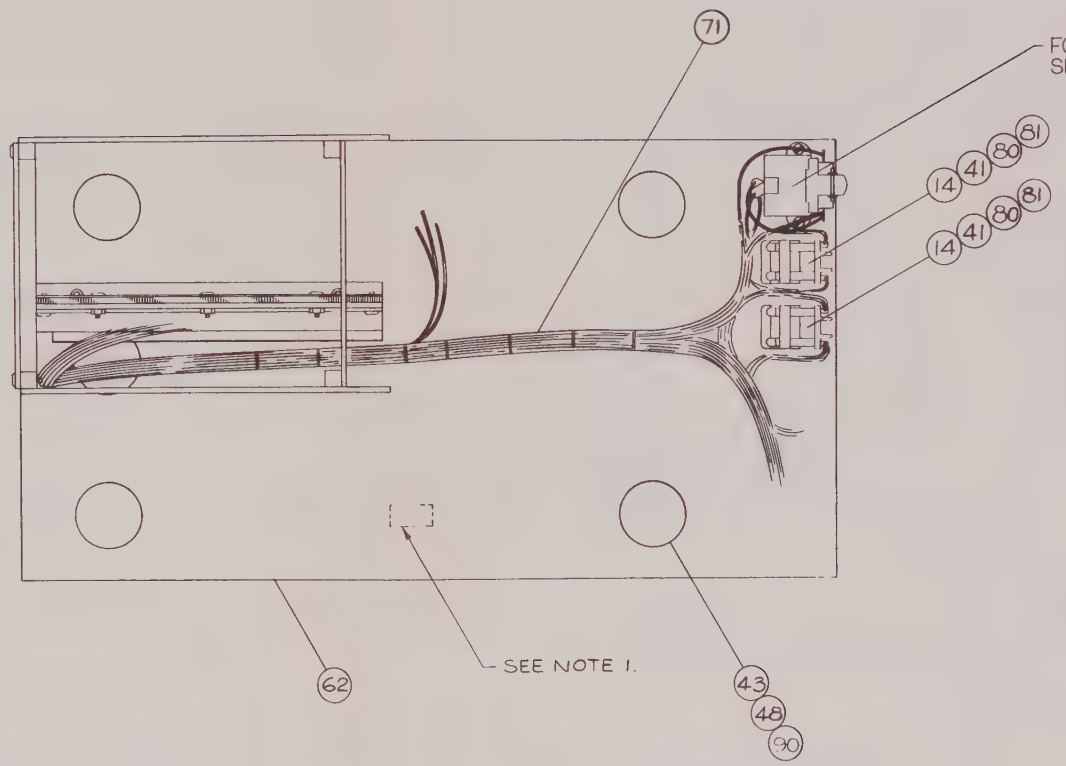
Oscillator Assy
Dwg. No. 6894 L

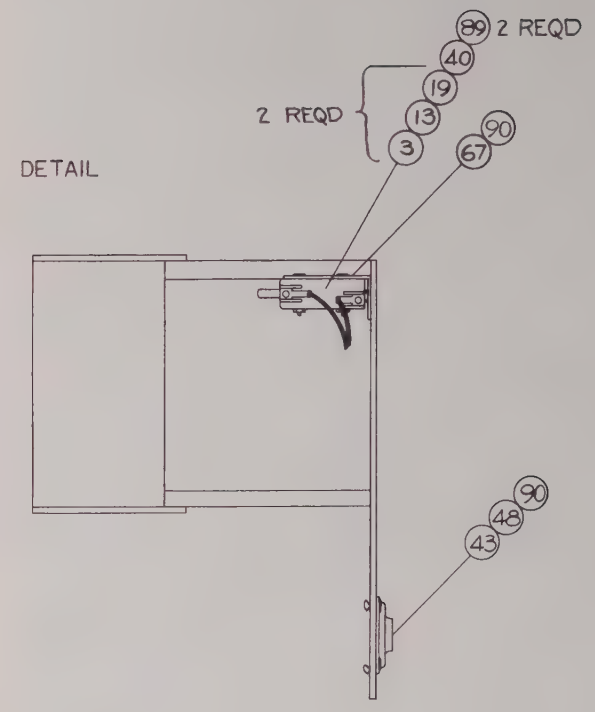
5-13/14



DETAIL C (NO SCALE)





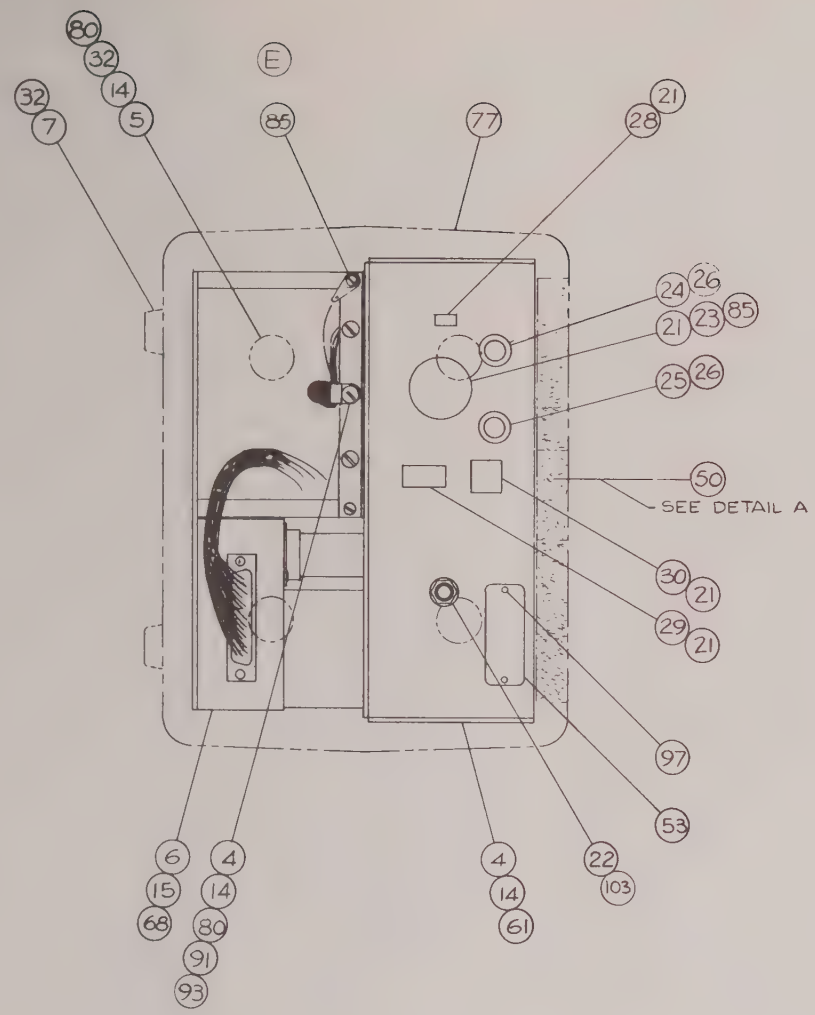


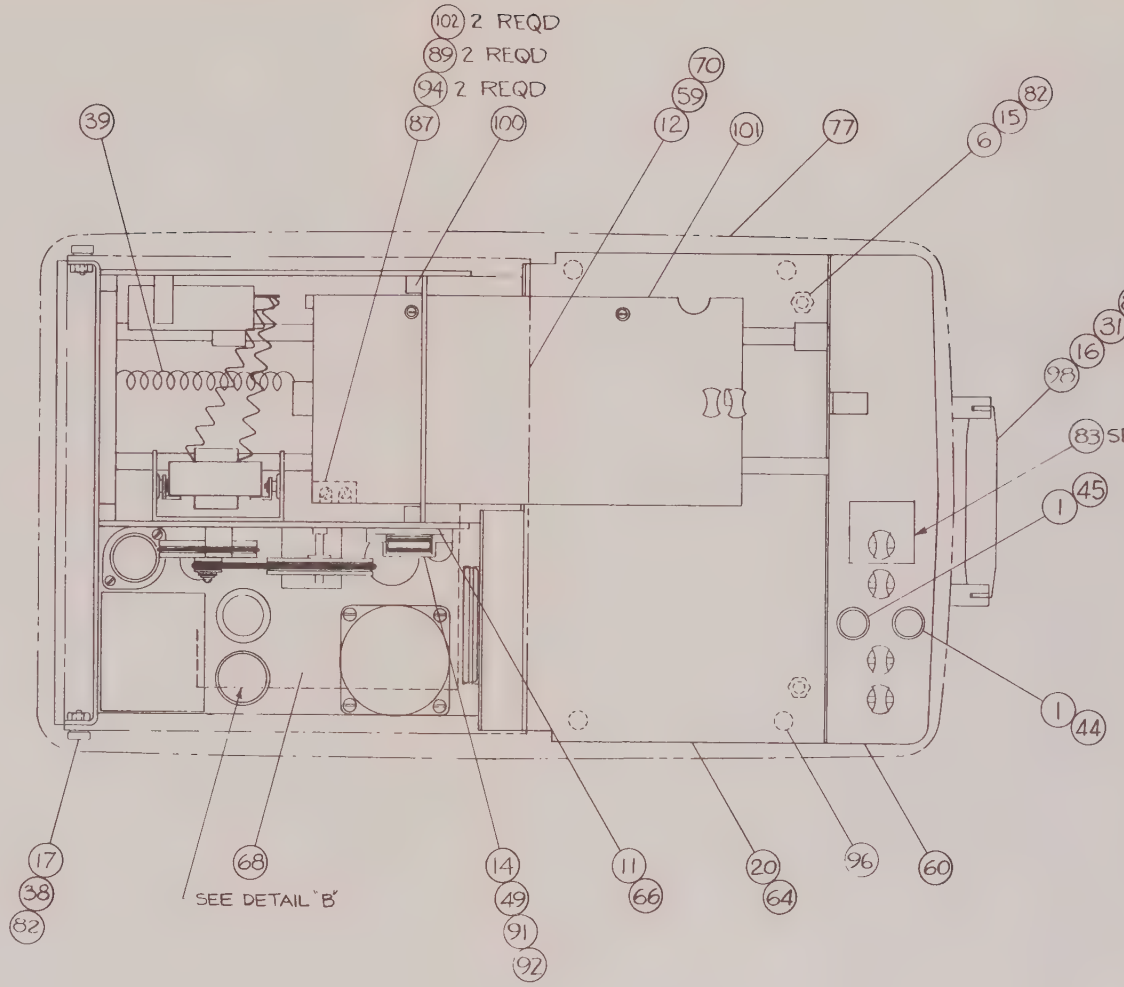
NOTES:

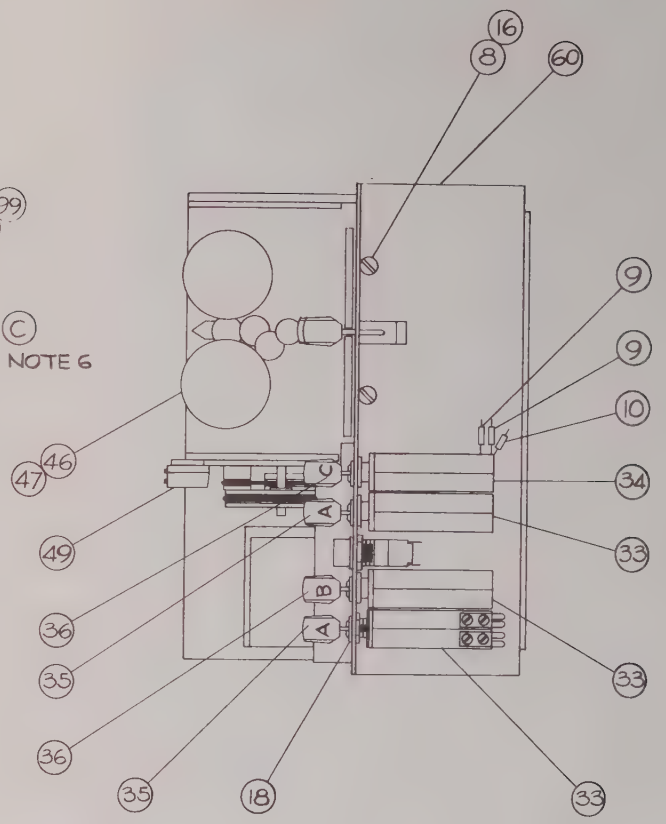
1. IDENTIFY ASSEMBLY AS TRACOR STOCK NO. 754109* AND REVISION LETTER OF ASSOCIATED P.L. IN LOCATION SHOWN.
2. SEE SEPARATE PARTS LIST FOR COMPLETE LIST OF MATERIALS.
3. PERFORM MECH. ADJ. PER SECTION A OF TRACOR SPEC 6904.
4. STOCK NO. 754109-0001 TO BE CALIBRATED TO ASA 1951 STANDARDS WITH HTL RANGE OF -10 TO 90 DB (SPECIFICATION 23059).
5. STOCK NO. 754109-0002 TO BE CALIBRATED TO ISO 1964 STANDARDS WITH HTL RANGE OF 0 TO 100 DB (SPECIFICATION 23059).
6. USED ON STK. NO. 754109-0001 ONLY. PLATE IS STK. NO. 8991-0001
7. LOCATION OF LABEL, ITEM 84, SHALL BE ON THE INSIDE OF COVER, ITEM 70.

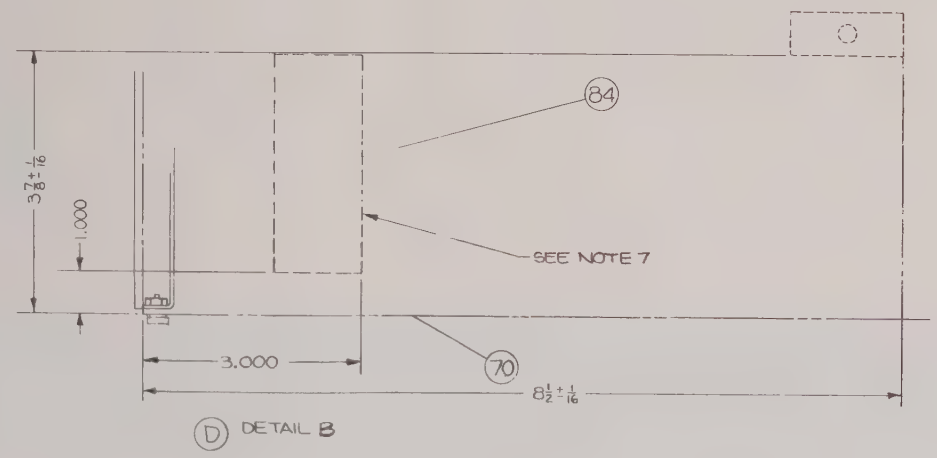
ARJ-4A Final Assy
Dwg No. 754109 R
1 of 2 Pages

5-15/16

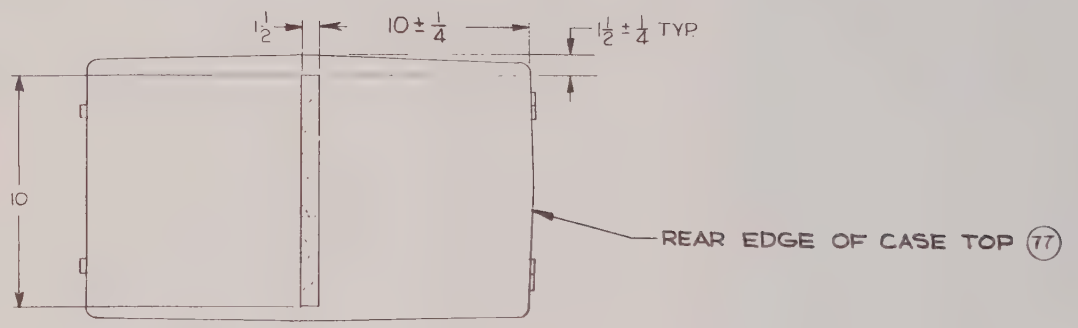








D DETAIL B



DETAIL A
(INSIDE VIEW)
SCALE: 1/4

SWITCH LEGEND			
DESIG	TRACOR P/N	DESCRIPTION	QTY
A	3755-0008	LOCK UP & DOWN	2
B	3755-0008	NO LOCK	1
C	3755-0011	LOCK UP ONLY	1

ARJ-4A Final Assy
Dwg No. 754109 R
2 of 2 Pages

5-17/18

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Your comments regarding this manual will help us improve future editions. Please comment on the usefulness and readability of the manual, suggest additions and deletions, and list specific errors and omissions.

EQUIPMENT NAME _____ MODEL _____

MANUAL NUMBER _____ REV _____

USEFULNESS AND READABILITY

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SUGGESTED ADDITIONS AND DELETIONS

ERRORS AND OMISSIONS (give page numbers)

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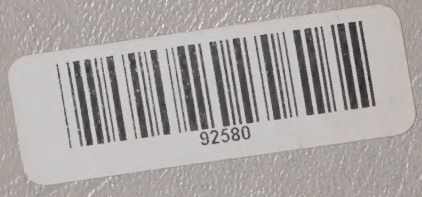
92580